1995

A study of the attitudes of faculty and DEOs at Iowa State University toward Deming's principles of total quality improvement (TQI)

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A study of the attitudes of faculty and DEOs at Iowa State University toward Deming's principles of total quality improvement (TQI)

by

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A Dissertation Submitted to the

Graduate Faculty in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Department: Professional Studies in Education
Major: Education (Higher Education)

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University
Ames, Iowa

1995

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This dissertation is dedicated to my husband

Hossain Eftekhari-Sanjani

and to the memory of my dear father-in-law

Ahmad Eftekhari-Sanjani

who passed away a few days before the completion of this book. Though your place appears empty, your soul is forever in our presence. May God bless you and have mercy upon you. You will be dearly missed.

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ACKNOWLEDGMENTS

"Two roads diverged in a wood, and I took the one less traveled by, and that has made all the difference" Robert Frost

I would like to take this opportunity to sincerely thank all those individuals who guided me toward one of life's major accomplishments.

A special thanks goes to my advisor Dr. Daniel Robinson who always provided words of encouragement and spent much time meeting with me rendering valuable advice. Thank you Dr. Robinson for all your help. It is deeply appreciated.

Sincere gratitude is extended to Dr. Marv Bouillon who served as my advisor while I was earning my Master's degree and continued to serve on the doctoral committee. I greatly appreciate your longevity as a member of my committee, your cooperation in scheduling the meetings, and your worthy input on the project. Thank you.

Grateful appreciation to Dr. Richard Warren who chose to remain on the committee after his retirement and continue to provide assistance with the statistical areas of the research. Thank you Dr. Warren for taking time out of your own schedule to assist me when needed. You truly served me beyond the call of duty.

Additional thanks go to committee members Dr. Janice Sweeney and Dr. Elizabeth Stanley for their time and beneficial comments on the paper. Thank you both.

Finally, the most appreciation goes to my dear husband Hossain Eftekhari-Sanjani who kept me on the path, gently nudging me back on the roadway each of the many times I strayed to the edge. Thank you dear heart for your patience, support, and making it all possible.

ABSTRACT

Recent issues facing higher education have created uncertainty over the traditional philosophies underlying higher education administration. As a result, some institutions are investigating Total Quality Improvement (TQI) as an alternative teaching and administrative practice. However, TQI implementation efforts sometimes fail due to poor attitudes of faculty and other employees toward the philosophy and toward change, in general.

This study investigates the attitudes of faculty and Department Executive Officers (DEOs) at Iowa State University toward some aspects of TQI by identifying possible group differences between DEOs and faculty and between/among faculty subgroups. To achieve the objectives, an instrument was developed by the researcher based on some issues more often raised in the literature regarding TQI and higher education. The Total Quality Improvement Attitude Scale (TQIAS) was mailed to a sample of 436 faculty members and the total population of 59 DEOs with appointments at Iowa State University during the Spring semester 1994. Useable questionnaires were received from 262 (60%) faculty members and 45 (76%) DEOs.

The results of this study are first reported on an item by item basis and then on factors extracted from the data. The results of the item-by-item analysis reveal several significant differences between faculty and DEOs and among faculty across academic rank, gender, college of appointment, tenure, and length of time as a faculty member. Results of the factor analysis yield significant differences across academic rank, college of appointment, and length of time as a faculty member.

The findings of this study can be used both within and beyond the concept of TQI. The research yields information, regarding the views of faculty toward controversial topics, that may

be useful in evaluating programs, policies, goals, and priorities of the university. The findings also can be beneficial in providing a better understanding of the campus culture and attitudes of campus subgroups.

CHAPTER I INTRODUCTION

In the mid 1960s many state colleges entered a period of rapid change and growth. Enrollment in public institutions of higher education for Fall 1965 increased 14.5% over that of the previous year, the single largest percentage increase to date (Table 1.1). From mostly teacher training colleges, these institutions changed to multipurpose state colleges and soon after became state universities. Accompanying these changes was rapid, and seemingly unlimited, growth. The baby boom generation was reaching the college age and an expansion in opportunities for minorities and women was taking place. The college age population was expanding, and there were plenty of students knocking at the university door. Emphasis at the time was on access to education and social and economic equality. The more students a school admitted, the more government funds they received. Colleges and universities began to lower admittance and graduation standards and to develop a multitude of new courses, degrees, and programs. Most funding policies provided additional funds for more students and similar programs were supported similarly. It was a sellers market, and funding incentives were clear; enroll more students, offer more programs and grow (O'Neil, Harwood, & Osif, 1993; Carothers, 1992).

Between the years 1965 and 1975, enrollment in public colleges and universities had an annual increase ranging from 4% to over 14%. During this period enrollment had more than doubled (Table 1.1 and Figure 1.1). However, admitting an increasing number of students meant admitting students who previously may not have been eligible. Remedial courses in higher education institutions were being seen for the first time and some of the older faculty were voicing concerns about the erosion of educational standards and quality. Public concern began to

surface about increased access being achieved at the cost of quality and excellence. The growth in the college-age population was beginning to level off and so were government dollar resources. Complaints were coming from institutions that, at the current level of funding, the quality of education was at stake.

Following a decade of rapid increase, enrollment in public institutions of higher education declined in fall of 1976 by 2%. From Fall 1964 to Fall 1975 enrollment had increased by 112%, while the decade between Fall 1975 and Fall 1985 realized an increase of only 9% (Table 1.1

Table 1.1. Enrollment trends in public higher eduction institutions Fall 1964 to Fall 1993, and projected enrollment to 2002 (Enrollment figures in 1000s).

Year	Enrollment in Public Institutions	% Change	Year	Enrollment in Public Institutions	% Change
Fall 1964	3,468		Fall 1984	9,477	-2.13%
Fall 1965	3,970	14.48%	Fall 1985	9,479	0.02%
Fall 1966	4,349	9.55%	Fall 1986	9,714	2.48%
Fall 1967	4,816	10.74%	Fall 1987	9,973	2.67%
Fall 1968	5,431	12.77%	Fall 1988	10,161	1.89%
Fall 1969	5,897	8.58%	Fall 1989	10,578	4.10%
Fall 1970	6,428	9.00%	Fall 1990	10,741	1.54%
Fall 1971	6,804	5.85%	Fall 1991	11,174	4.03%
Fall 1972	7,071	3.92%	Fall 1992	11,277	0.92%
Fall 1973	7,420	4.94%	Fall 1993	11,187	-0.80%
Fall 1974	7,989	7.67%	Fall 1994	11,305	1.05%
Fall 1975	8,835	10.59%	Fall 1995	11,393	0.78%
Fall 1976	8,653	-2.06%	Fall 1996	11,537	1.26%
Fall 1977	8,847	2.24%	Fall 1997	11,673	1.18%
Fall 1978	8,786	-0.69%	Fall 1998	11,864	1.64%
Fall 1979	9,037	2.86%	Fall 1999	12,043	1.51%
Fall 1980	9,457	4.65%	Fall 2000	12,220	1.47%
Fall 1981	9,647	2.01%	Fall 2001	12,355	1.10%
Fall 1982	9,696	0.51%	Fall 2002	12,478	1.00%
Fall 1983	9,683	-0.13%			

Source: U.S. Department of Education, National Center for Educational Statistics

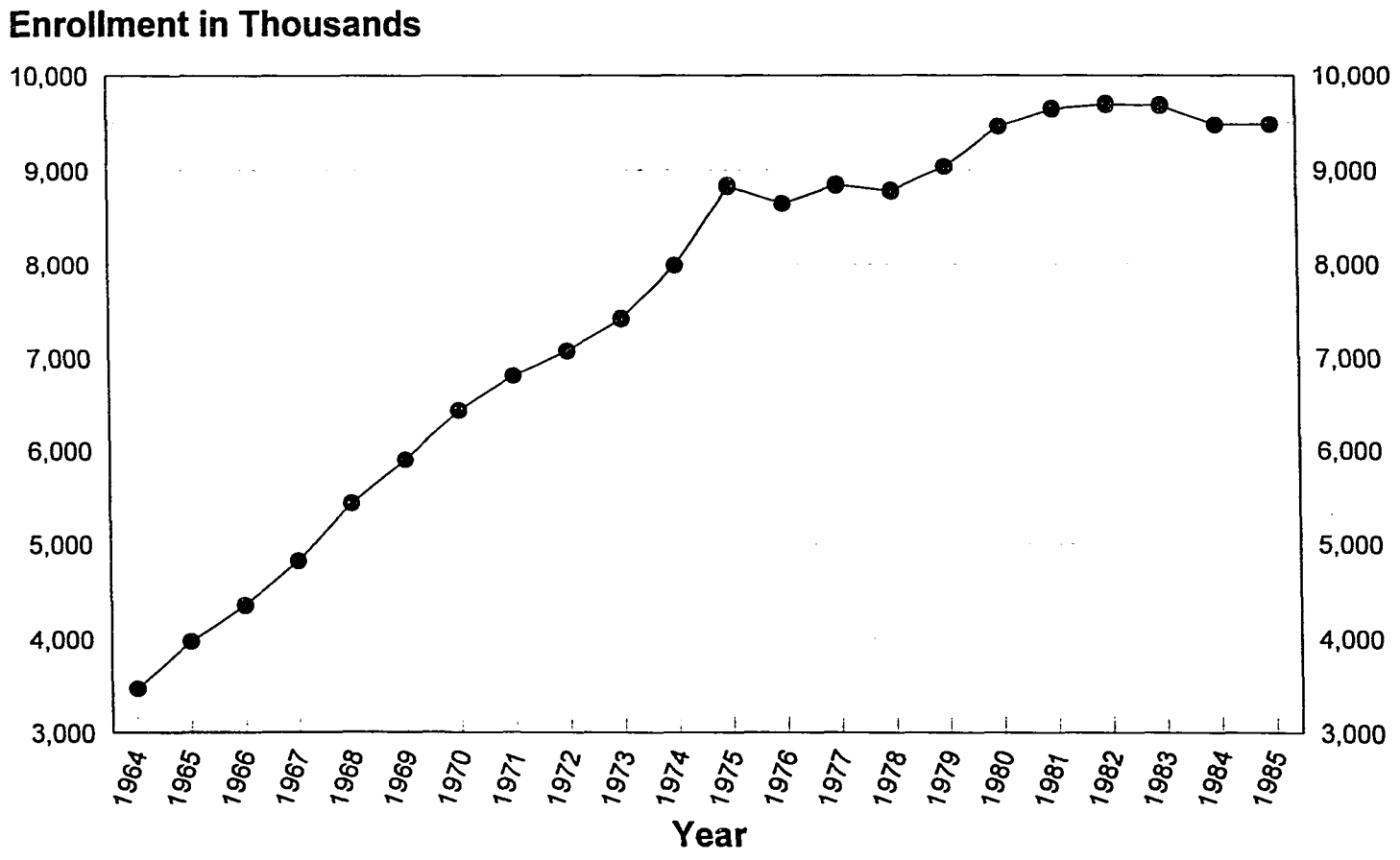


Figure 1.1. Enrollment in Public Higher Education Institutions from Fall 1964 to Fall 1985 as Reported by the U.S. Department of Education, Center for Education Statistics.

and Figure 1.1). In the early to mid 1980's, in the wake of a national economic budget crisis, government and public groups began calling for reform. They wanted to know how their investment in education was being spent. At the same time, business and industry were complaining about the declining quality of new graduates on the job. In addition, declines in the traditional college age population strengthened the argument for the need for new strategies. Public pressure for higher education to yield more highly qualified graduates was coming from all sides, as public confidence in the worth of higher education declined. Reports from agencies, like the National Institute of Education, Association of American Colleges, Education Commission of the States, and National Governors Association began to call for reform and for institutions to report statistics regarding what various constituencies might expect from their investments in education (Ewell, 1991)

Throughout the 1980's decreased government funding and projection of a declining traditional student population continued. Many institutions found themselves in financial difficulty, as the power in the market place began shifting from sellers to buyers. Today, students, parents, funding agencies and other constituencies have more choices than ever before and are exercising those choices in choosing where to put their education dollars. They are demanding ways to know that they are investing in a quality education. At the same time, higher education institutions are seeking answers to such questions as; How do we know when resources are adequate to fund a given enrollment? Must quality occur at the expense of access, or is there a better way? Are current resources enough to fund new students at a quality level? Will higher admittance and graduation standards cause enrollment levels to decline too much? These issues, along with growing concern about the quality of higher education at the federal,

state, and local levels, have created an urgency to discover new ways to measure the value of an education.

In an effort to improve the quality of education, some institutions of higher education have adopted Total Quality Management (TQM), also known as Total Quality Improvement (TQI), or Total Quality Control (TQC). TQM is an operating philosophy that calls for continuous quality improvement by focusing on the long term, continually improving work process, focusing on consumer requirements, investing in human resource development through training and recognition, promoting and encouraging teamwork, empowering all employees, and providing the leadership to direct the quality improvement efforts. It has less to do with management and more to do with leadership, and while this researcher prefers the term Total Quality Improvement, due to circumstances of literature review, TQI and TQM will be used interchangeably in this paper to refer to the philosophy.

The TQI philosophy was developed by a statistician, Dr. W. Edwards Deming, in the early 1940's and introduced into Japanese industry in 1950, to aid in post war economic recovery. The success of the Japanese industry today is largely attributed to Deming's philosophy. Deming has summarized the basis of his philosophy in the following 14 points (Gitlow & Gitlow, 1986; McCullough, 1988; Deming, 1986; Cornesky et al., 1992; Logothetis, 1992; Walton, 1986).

1. Create constancy of purpose toward the improvement of product and service. Take a long term perspective and commitment instead of the traditional short run, day to day view.
2. Adopt a new philosophy of "doing it right the first time" in which defects, delays, mistakes, and reworks are no longer acceptable.

3. Cease dependence on mass inspection at the end of the process in an effort to achieve quality. Instead, rely on statistical evidence that quality is built into the process and mass inspection is not needed.
4. End the practice of purchasing solely on the basis of the price. Make purchasing decisions based on reliable measures of quality along with the price, and move toward long-term relationships of loyalty and trust with suppliers.
5. Improve constantly and forever the system of production and service in order to improve quality and productivity and thus constantly decrease costs. This requires continual improvement in work process using reliable statistical measures as tools. (The six recommended tools are flow charts, Pareto analysis, cause and effect diagrams, control charts, histograms, and scatter diagrams.)
6. Institute modern training methods as an ongoing process. Employees should be trained about their jobs, the organizational mission, the 14 points, and statistical tools. Use reliable statistical measures to identify when an employee has received adequate training and to determine when additional training will have no effect.
7. Provide supervision and leadership for never-ending improvement. Instead of searching for individual wrongdoing, create a positive, supporting, coaching and trusting atmosphere that encourages the reporting of problems.
8. Drive out fear so that everyone may work effectively. Provide a consistent, supportive, nonthreatening, secure work environment.
9. Break down barriers between departments and divisions, so that everyone can work as a team to solve problems. Encourage teamwork.

10. Eliminate numerical goals, slogans, and targets that seek new levels of productivity without providing the means to do so. Replace them with posters and slogans about the progress being made in never-ending improvement efforts.
11. Eliminate work standards and quotas that consider only quantity and not the quality of products and services. Quotas encourage workers to do whatever is necessary to meet the quota without considering the quality of the output.
12. Promote pride of workmanship and remove barriers to the contrary. Put more emphasis on the "human" in dealing with human resources.
13. Provide education, retraining and self-improvement for everyone. If an organization wants to utilize its employees to the fullest it must take responsibility for their educational needs. Often these are the needs not adequately met by public education.
14. Create an organizational structure that will push the prior thirteen points everyday.

In about 1980, following the airing of an NBC documentary that featured Dr. Deming, the TQM philosophy began to permeate industries in the United States. Today, it is being used in many organizations including private industry, government offices, hotels, hospitals, restaurants and a few dozen higher education institutions throughout this country. However, while the university is a place for new ideas and innovation, many institutions still hold on to a traditional reluctance to accept change in the leadership and management of the institution. Because of some distinct differences between institutions of higher education and other organizations, there are perceived problems in identifying the relevance of Deming's 14 points to the operations of colleges and universities. These problems tend to be seen more on the academic side of the university than in the administrative areas simply because of the nature of these units. Most

higher education institutions that have begun to implement TQI have limited their efforts to some administrative areas rather than a university wide implementation which would include the academic departments.

Rationale

Appropriateness of the research topic

Current practices relating to the operation of educational institutions and administration of higher education are based on long standing theories regarding the values and purpose of higher education within the society. The changes in socio-economic environment, however, have necessitated a change toward quality improvement in the educational system. TQI as proposed by Deming and adopted by many private sector organizations, as well as some public organizations and educational institutions, promises quality improvement and has proven to be successful in many institutions that have adopted it. Nonetheless, an important step in introducing change into an existing structure is that of identifying the variables that could influence the success or failure of the outcome, which is particularly true in terms of adopting Deming's philosophy.

This study seeks to investigate the attitude of faculty and DEOs at Iowa State University toward Deming's 14 principles of total quality improvement. It intends to elaborate on some of the factors that contribute to the problem of quality in higher education. The main objective of the study is to identify the attitude of administration and faculty toward the existing practices and changes required to improve the performance quality of higher education, as it relates to Deming's 14 points. The rationale underlying this study as a valuable research activity is best

identified by John W. Best (1977). He contends that a research project should have several characteristics including the following:

1. it seeks a solution to a problem
2. it is generalizable and goes beyond the specific object studied
3. it demands accurate observation and description
4. it involves gathering new data or using existing data for a new purpose in order to add something new to knowledge
5. it involves a problem that is significant, and solving the problem would make a difference in theory or practice.

Review of the related literature indicates that there are no other studies of this specific nature. It is expected that, as a result of this research, a better understanding of the attitudes (which are manifest in long standing values) held by individuals important to the educational process, will ensue. It is also hoped that further studies, of other important groups within higher education, can build on the findings of this research to result in improved means of administering higher education in the future. Baird (1971) maintains that

> Researchers and test developers need to be more concerned about the possible uses to which their instruments might be put, and should try to develop instruments and information systems that could be the basis for individual and institutional decisions. It is better to be useful and interesting, than to be merely interesting (Baird, 1971, p. 85)

It is the intent that this research be useful to decision making, interesting, and add to the body of knowledge.

Need for the study

The need for this study is threefold: the general need to study campus attitudes, the need for higher education institutions to investigate TQI as an alternative method of governance, and the need to study faculty attitudes toward quality improvement efforts on campus.

Need to study campus attitudes Attitudes affect how individuals react to situations, people, objects, and other circumstances. They dictate where people will focus their energy and attention (Seymour, 1993b). Consistencies in behavior are often attributed to the construct attitude, and if the attitude of an individual toward a particular phenomenon is known, it can be used in conjunction with other variables to predict and explain other behaviors or to manipulate unwanted behaviors (Shaw & Wright, 1967).

Baird, Harnett, and associates (1980) suggest that information about all aspects of the college environment can (a) provide suggestions on how to improve institutions, (b) help decision makers avoid actions that are detrimental to the institution, (c) allow for comparisons with other institutions to identify areas where changes are needed, (c) identify areas of agreement and disagreement among subgroups, and (d) identify feelings toward policies, goals, and priorities of the institution. They contend that while assessment of student attitudes is very important, the attitudes of other campus groups such as faculty, administration, and nonacademic employees are as significant, but often overlooked. According to Baird and associates, some advantages of conducting research about attitudes on campus are that the research can help universities to identify and deal with problems, it can aid in evaluating programs and innovations, and it can help decision makers in understanding the campus culture.

Need for higher education to investigate TQI The same economic, cultural, lifestyle, and technological changes that have impacted business and industry are also impacting higher education. Higher education institutions cannot isolate themselves from these changes and continue to administer education today and into the future the same way as they did in the past. In the past, growth in higher education and the resources to fund it were abundant. Regardless of how institutions were managed, what kind of planning they did, or whether they had specific goals, they prospered and grew. Today this is not the case. At a time when many colleges and universities are trying to increase the perception of the quality of their education, the Deming method could help in the endeavor (Miller, 1991).

As Deming (1986) appropriately worded it "we're in a new economic age". Higher education cannot be isolated from the socio-economic environment that surrounds it. Resources are scarce, as are students, and strategies of continuing to raise taxes and tuition in order to fund education are no longer feasible. Colleges and universities can no longer rest assured that students will be lined up at their doors and business and industry will be anxious to hire their graduates.

According to Seymour (1993b), the attitude that quality costs too much is prevalent because people do not understand the cost of "unquality". It is seldom that the costs of not conducting student and other constituent surveys, not hiring the expensive faculty, or not improving classroom instruction are calculated. Likewise, the cost of reeducating newly enrolled students, correcting mistakes, or students who drop out is rarely determined. While quality does cost, not tending to quality can cost even more and may eventually cost the demise of the organization.

Need for studying faculty attitudes toward TQI Faculty are a powerful unit on campus, and their involvement is essential in order for higher education institutions to successfully implement TQI. "Both faculty and student involvement [in TQI implementation efforts] are necessary because they are the ones most likely to know how to improve the educational process" (Acherman et al., 1993, p. 33). The role of professors in the university is much the same as physicians in a hospital. As in the hospitals when doctors were not involved, the quality implementation efforts were less than comprehensive and critical processes could not be fully addressed (Brigham, 1993).

One of the most important elements in any change process is attitude, and because attitudes are often deeply ingrained, they are very difficult to change. Only with a change in deeply ingrained attitudes will a complete cultural change occur (Cornesky et al., 1992). According to Ludeman (1992) improvement programs that are initially successful often see diminishing enthusiasm, after a period of time, because permanent changes in attitudes did not transpire. Only with permanent changes in attitudes can lasting lifestyle changes occur.

Much of the way colleges and universities operate involves long-standing, deeply ingrained attitudes about the purpose of higher education and its relationship to society. In the rise of funding cuts, changes in student populations, calls for accountability, and changes in the reasons for attending college, changes in long-standing attitudes about higher education are needed in order to keep higher education institutions viable. Attitudes, in particular, that need to be changed are (1) the denial that the university is part of the service industry and provides services to society and (2) the belief that quality is not affordable particularly in light of budget cuts. Many people within higher education still find it difficult to accept that the university has certain groups (students, employers, alumni, parents etc.) to which it provides services. Instead,

they believe the university to be so unique and complex that it is set apart from any other industry. In reality, however, these societal groups support higher education services with tax dollars, gifts, endowments, tuition etc. and in return the institution provides society with services. It is the position of some that this attitude must change and the university must align itself with the needs of the society (Seymour, 1993b)

Purpose of the study

Deming (1986) contends that accepting TQI requires a complete cultural transformation, however, faculty attitudes both directly and indirectly can create impediments to the academic culture being transformed. Winter (1991) states that "understanding the barriers and developing appropriate responses are critical preconditions to the implementation of TQI programs" (p. 35).

Many of the barriers to TQI implementation involve relating the issues contained in Deming's philosophy, originally implemented in industry, to a university setting. Some of the controversial concepts include thinking of the university with business terms like customers, products, raw materials, suppliers, defects and reworks. Subsequently, identifying these concepts and achieving consensus on operational definitions within the university is a barrier. For example, for some, the student is a customer of the educational system, for others, a raw material into the system, and for still others, a product of the system of which business and industry are the customers.

Another barrier to TQI implementation within the university involves the meaning of quality. Currently, in higher education, there is controversy over what quality is, how it is assessed, who is responsible and accountable for it, and how it is improved. Faculty have a definition of quality that relates to peer and professional recognition stemming from research

contributions, rather than from effective classroom teaching. Universities often place the value of institutional prestige ahead of the value added to an undergraduate student (Folger, 1984). The public and legislators, on the other hand, consider a quality institution as one that educates its students well and they look for the educational value added to the graduate. In a third aspect of quality, administrative personnel view quality as maximizing resources and running an efficient operation.

Still another barrier includes the resistance to change because of a perceived threat to long held values of academic freedom and diversity. To many, control of processes conjures up images of sameness - admitting a bunch of entering students who are all the same, putting them on the educational assembly line, and having graduates who come out of the educational process the same. Among institutional administrative areas, one of the major obstacles to implementation often cited is the unwillingness or inability of managers to relinquish managerial power to supervisory and front line employees.

Given the current controversial attitudes toward TQI principles in higher education institutions, it is felt that an assessment of these attitudes, from those who can influence successful implementation, is warranted. Specifically, Iowa State University was chosen for this research because it is in the early stages of TQM efforts and does not yet have a formal university-wide TQM plan. The notion is that if one can measure possible attitudinal barriers and positive attitudinal areas, then the results could serve as a guideline for the concentration of training, education, and information distribution efforts in the early stages of TQM planning. Extra efforts to change negative attitudes could be concentrated in the areas most needed, and areas where there may be difficulty in implementing TQI principles can be identified. Therefore, the purpose of this study is to assess attitudes of faculty and DEOs, at Iowa State University, toward issues

identified in Deming's 14 principles of quality improvement, as they relate to the university setting. Specifically, the major problem is to study the faculty's and the DEOs' perceptions of the involvement, methods, techniques, commitment, innovation, education, and cultural transformation required for the successful implementation of TQI.

Limitations of this Study

1. This study concerns only the faculty and DEOs employed at Iowa State University and caution should be exercised when applying the results to other higher education institutions.
2. This research deals with self-reported data and is therefore limited to whatever information the respondents are willing to share and how truthfully they respond.
3. This research uses mail-in questionnaires as the method of data collection, therefore, the study is based on the responses of only those who are willing to fill out and return the questionnaire.

Scope of the Study

The subject of this study is the attitudes that faculty and DEOs, at Iowa State University, hold toward Deming's 14 principles for quality improvement. The main focus is on the attitudes of the faculty group and how the variables of rank, gender, college, age, tenure, and length of time as a faculty member in a higher education institution affect their attitudes toward the principles. A secondary point of the study is how faculty and DEOs differ in their attitudes.

Research Questions

The review of related literature suggests that individuals within the academic side of the institution hold less favorable attitudes about the TQI principles than those in administrative areas and while faculty was addressed as a whole, faculty subgroups were not a major part of the literature. Therefore, the research questions as dictated by the review of the literature are:

1. Do DEOs have significantly different attitudes toward Deming's 14 principles than faculty?
2. Are there significant differences in the attitudes of faculty at Iowa State University toward Deming's 14 principles when the effects of the variables of academic rank, gender, college, age, tenure, and length of time as a faculty member are considered?

The global hypotheses for this research are:

HO1: There is no significant difference between the attitudes of faculty and DEOs toward Deming's 14 principles.

HO2: There is no significant difference among the attitudes of faculty toward Deming's 14 principles with respect to their academic rank, gender, college, age, tenure, or length of time as a faculty member in a higher education institution.

Assumptions

1. The subjects in the study are able to read and understand the directions and statements contained in the questionnaire.
2. The subjects are truthful in recording their answers on the questionnaire.
3. The subjects are aware of their true feelings toward the attitude statements.

4. The university in which the instrument is administered has not made a formal commitment to TQI implementation and is still very early in improvement projects.

Definition of Terms

Attitude: A predisposed feeling or emotion toward a fact, statement, object or other phenomenon that directs the overt behavior of an individual.

Faculty: Individuals with a tenure track appointment at faculty rank, who are not a department head or chair. This excludes those with temporary, visiting, adjunct, and affiliate faculty appointments.

Department Executive Officer (DEO): Faculty with an administrative appointment at the rank of department head or chair, except those with temporary, visiting, adjunct, and affiliate appointments.

Higher Education Institutions: Colleges and universities at the postsecondary level, either private or public.

Total Quality Improvement (TQI) Attitude Scale (TQIAS): The instrument developed by the researcher to assess the attitudes of faculty and DEOs at Iowa State University toward Deming's 14 principles of quality improvement. The instrument contains demographic questions and statement-type questions with a 5-choice Likert-type scale ranging from agree to disagree.

TQI Implementation: Physical action, following a formal commitment to the TQI philosophy, using Deming's principles, to identify problems in processes within the organization and to improve those processes toward a goal of continuous improvement. For the purpose of this

study, TQI implementation would take place after formal commitment to the philosophy and education and training in the TQI concept have been completed.

Organization of the Study

The remaining chapters of the dissertation are organized in the following manner:

Chapter I The introductory chapter is organized into eight major sections including an introduction, rationale, limitations of the study, focus of the study, research questions, assumptions, definition of terms, and organization of the study. The rationale section contains three subsections including appropriateness of the research topic, need for the study, and purpose of the study. In these subsections, the researcher examines why this research should be conducted, how it contributes to the literature, and who will benefit and how.

Chapter II The Review of Literature contains four major sections; history of management theories, TQM in business, industry, and health care, TQI in higher education, and conclusion. The chapter begins with a brief discussion of the history of management and several theories of management that have evolved throughout its history. The history and origin of TQI in business and industry follows, which leads into the total quality improvement theories of four major quality leaders, W. Edwards Deming, Joseph Juran, Phillip Crosby, and Masaaki Imai who developed the concept of *Kaizen*. Writings of various authors on TQI in business, industry, and health care regarding differences from traditional management, successful implementation efforts, and problems with implementation are then reviewed.

The next part of the review of literature deals with TQI in the higher education sector. It begins with a brief discussion of the current state of higher education, followed by reviews of

literature about how TQI can improve higher education, positive TQI experiences within higher education, problems of and barriers to implementation, and a summary rationalizing the need for this study.

Chapter III Methodology contains the sections of development of the data collection instrument, population and sample, pilot testing, data collection, research questions and hypotheses, and research design.

Chapter IV Chapter four, Results and Analysis, contains the results of testing the null hypotheses. It includes the five sections of descriptive data, reliability of the test, the item-by-item analysis, the factor analysis and a summary.

Chapter V Chapter five, Disscussion, contains the sections of factor analysis and item-by-item analysis discussion, conclusion, and recommendations for further study.

CHAPTER II REVIEW OF LITERATURE

History of Management Theories

Throughout the years several management theories have evolved, each having a different way of viewing organizations, their activities, and how people function within organizations. One theory places its emphasis on people, while others emphasize fundamental principles, mathematics, or systems. These theories help explain what management is and how to approach it as a field of study, as well as, aid in problem solving when dealing with complex issues like attitudes of people, work environments, and allocation of resources.

Classical Management Theory

The classical school of management originated during the Industrial Revolution, which began in England with the invention of steam powered machinery. This new technology along with vast amounts of raw materials and laborers created a need for management. The writings of the pioneers of classical management offered advice on improving operations and thoughts about management as both a science and an art. One of the most important ideas stemming from early classical management theory is "division of labor", the division of work into different processes that could be taught and mastered quickly by a single individual. The classical management school of thought can be divided into two divisions, classical scientific and classical administrative.

Classical scientific management arose out of the need to increase productivity. During the last few decades of the nineteenth century, industry was expanding rapidly, trying to keep up

with the increasing demand for more goods. Hand labor was giving way to mechanized mass production methods and it soon became apparent that systematic methods of organizing and standardizing were needed on the production line. The emphasis of scientific management was to try to find the one best way of performing the work (George, 1968; Pollard, 1974).

Frederick W. Taylor, generally conceded to be the father of scientific management, was an early pioneer in time and motion study, of which the objective is to remove fatigue and improve efficiency and output. From his practical experiences at Enterprise Hydraulic Works, Simonds Rolling Machine, Bethlehem Steel, and Midvale Steel, he developed his own work methods and procedures, and in the early 1880's, while associated with Midvale Steel, he began his time and motion studies. Taylor had an appreciation for the pride in workmanship shown by the workers, but he noticed many negative circumstances on the job, including: poor quality of management; poor division of labor between workers and managers; no work standards or systematic methods of decision-making; and what he called worker soldiering (taking it easy) on the job. With poor shop conditions in mind, Taylor began a series of experiments and research that lasted nearly thirty years. He conducted experiments on workers, machines, methods, speeds, materials and other elements of the production process. When he was finished, a philosophy had emerged which became known as scientific management (George, 1968; Pollard, 1974).

Taylor realized that under the existing management system, getting the work done was mostly the responsibility of the workers. Under his new system, responsibilities would be divided so that management would be in charge of planning, arranging the work and deciding what was to be done, when, where, and how, while the workers would only be responsible for doing the work as they were instructed. He proposed that the work of each employee be planned

out by the management, in advance, and that each worker receive complete, detailed instructions describing his/her task and noting the means by which it should be accomplished. Each job would have a fixed, standard time established by time study experts. This time would be based upon the time it would take a "first rate man" to perform the job. He also advocated a system of pay based on output by an individual worker, in other words piece rate pay.

Taylor emphasized that this new system of management would require a complete change in attitude, a "mental revolution" for both management and workers. Taylor states:

> Scientific management is not an efficiency device. . . . It is not a new system of figuring costs; it is not a new scheme of paying men; . . . Now, in its essence, scientific management involves a complete mental revolution on the part of working men engaged in any particular establishment or industry - a complete mental revolution on the part of these men as to their duties toward their work, toward their fellow men and toward their employers. And it involves the equally complete mental revolution on the part of those on the management's side - the foreman, the superintendent, the owner of the business, the board of directors - a complete mental revolution on their part as to their duties toward their fellow workers in the management, toward their workmen and toward all of their daily problems. *And without this complete mental revolution on both sides scientific management does not exist.* (Pollard, 1974, p. 6-7)

Scientific management appears to take away almost all responsibilities from the worker. It diminishes the worker's job to nothing more than carrying out instructions and operations. In fact, much of the industry developed from the beginning of the 20th century until the present day has followed scientific management principles rooted in Taylor's theory. Today, psycho-sociologists argue that as a result, for many people, their work has become a meaningless activity, bore, burden, chore. Taylor's philosophy had emphasized bonuses, pay incentives, and continuous on the job training to motivate workers to increase their productivity and reach their full potential so that they could be placed in higher level jobs. However, in the practice of scientific management, continuous on the job training and upward movement of the workers did not happen. If it had, this may have helped to meet self actualization needs and put more

meaning into work. The path down which early scientific management has led industry, is believed by psycho-sociologists to be the main cause of industry's ill's today (Wren, 1972; Pollard, 1974; George, 1968).

While the classical scientific management branch arose from the perceived need for improving productivity, the classical administrative management branch grew out of the need to manage the complex organizations that emerged from the Industrial Revolution. This branch emphasized the development of managerial principles rather than work methods. Henri Fayol, the leader among administrative management theorists, emphasized the importance of understanding the principles that underlie good management practices and on developing a general management theory to be used as a guide to managers. He developed 14 general principles of management based on his own management experiences, but stressed that the principles are only a guide and that, in reality, there could be any number of principles. Fayol also cautions that great skill is required in adapting the principles to a particular organization (Pollard, 1974).

Behavioral Management Theory

Not much was studied about the psychological or human applications of scientific management until nearly fifty years after Frederick Taylor's studies, when behaviorists took management another step forward. They focused on employees as individuals, parts of work groups, and persons with needs to be met by the organization. Behaviorists also theorized that people have needs for recognition and social satisfaction, and that the social environment of employees had a great influence on productivity.

Mary Parker Follett was one of the first theorists to begin doing research toward the more humanistic, psycho-sociological management approach. Follet's philosophy and behavior

management theory are based on the assumptions that work cannot be separated from other human characteristics, and that the quality and quantity of workers' output are influenced by conditions both on and off the job. She postulated that there are many uncontrollable variables in humans, such as fears, hopes, aspirations, and other emotions that must be considered when looking at cause and effect relationships in work (George, 1968). Follett contended that work is a continuous process of interrelationships between people and offered what she called the principle of integration: "the creation of conditions such that the members of the organization can achieve their own goals best by directing their efforts towards the success of the enterprise" (Pollard, 1974, p. 227).

Another behaviorist and industrial psychologist, Douglas McGregor, challenged many concepts, ideas, and assumptions which have formed the basis of much industry practices today. He stated that much management practice is counter to human nature and thus is ineffective. McGregor contends that behind every managerial decision or action are certain assumptions about human nature and behavior. He hypothesized that there are two sets of assumptions about people which serve as a base for managerial action. These are known as Theory X and Theory Y (Pollard, 1974; Cullen & Hollingham, 1987).

A manager basing management decisions on Theory X would impose a directive leadership style on employees. Coercion, negative motivation, and refusal to allow employee decision making would probably be the actions of the manager. Much traditional and current managerial practices are based on the assumptions of Theory X. These assumptions are:

1. The average human being has an inherent dislike of work and will avoid it if he can.

2. Because of this human characteristic of dislike of work, most people must be coerced, controlled, directed, threatened with punishment to get them to put forward adequate effort toward the achievement of organizational objectives.

3. The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, wants security above all.

McGregor concludes that this type of human behavior is a result of management strategies. He states: "it neither explains nor describes human nature . . . people behave in a way which appears to lend support to Theory X not because they are made that way but because such behavior is a reaction to the practices of management" (Pollard, 1974, p. 225). A manager's assumptions about people affect those people and thus their subsequent behavior. What the manager then experiences affects his/her approach to subsequent management practices.

McGregor believed that Theory Y more closely describes people's behavior, motivation and attitudes towards work. A managerial philosophy founded on Theory Y will allow a leader to work with people as individuals, involve employees in decision making, openly encourage employees to seek responsibility, and work with people to achieve their goals. Management practices based on Theory Y support the needs of the organization and the individual. The assumptions of Theory Y are:

1. The expenditure of physical and mental effort in work is as natural as play or rest.

2. External control and the threat of punishment are not the only means for bringing about effort towards organizational objectives. Humans will exercise self-direction and self-control in the service of objectives to which they are committed.

3. Commitment to objectives is a function of the rewards associated with their achievement.

4. The average human being learns, under proper conditions, not only to accept but to seek responsibility.

5. The capacity to exercise a relatively high degree of imagination, ingenuity, and creativity in the solution of organizational problems is widely, not narrowly, distributed in the population.

6. Under the conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilized.

To further explain, he states that it is not what's inherent in the human being that makes work a source of satisfaction or punishment, it is the conditions under which he/she works. In as much as these variables are controllable, it is management's responsibility to provide conditions in which humans can satisfactorily operate. Failure to do so is the source of poor worker habits. McGregor further contends that organizations in which management is based on Theory X are less successful than those in which management practices follow Theory Y. Management practices based on Theory X allow for little if any participation, however, practice based on Theory Y not only encourages participation, but helps both the organization to reach its goals and the employee to reach personal goals. Management practice in line with Theory X will cause a climate of control, fear, and direction, but practice in accordance with Theory Y will allow for a climate of participation, cooperation, and joint endeavor.

Quantitative Management Theory

Beginning in about 1940, with a British operational research organization, under the direction of P.S. Blackett, research began on another approach to management. The emphasis of the quantitative management school of thought, also known as operations management or management science is the application of quantitative or mathematical approaches to solving management problems. This theory takes a team approach and draws on the knowledge of various pertinent disciplines, for example, a mathematician, a physical scientists, an economist, an engineer, and a statistician, to study a given problem and find an effective solution. Blackett and his team were the first of their kind to demonstrate again and again the effectiveness of the team approach to solving problems. The use of statistical analysis, linear programming for

allocating resources, the development of prototypes prior to implementation, production scheduling techniques, and financial analysis are all examples of the quantitative management techniques. The major shortcoming in this management theory is that it does not address the human resources side of management (George, 1968; Wren, 1987).

There is a six step approach to solving problems using the quantitative management theory. These steps are:

1. Formulate the problem
2. Construct a mathematical model to represent the system
3. Derive a solution from the model
4. Test the model and the solution
5. Establish controls over the solution in case of changes in variables
6. Implement the solution

Systems Management Theory

Although the notion of systems has existed throughout history, it was Ludwig von Bertalanffy, a biologist, who first coined the phrase "general systems theory", in 1937. His goal was to develop a systematic, theoretical framework that could describe relationships among different disciplines, a "general systems model". It was not until the 1960's, however, that the concept of systems theory was introduced into the management field. Drawing heavily on earlier works, Richard Johnson, Freemont Kast, and James Rosenzweig applied the systems approach to managerial thought.

The systems school of thought is founded on the idea that management must understand all the various systems that comprise the organization and how the organization interacts with the larger external environmental systems. A system is a group of interrelated parts that operate as a

whole to achieve stated goals or to function according to a plan or design. An organization has various departments or divisions that form subsystems when put together form the system of the organization. To understand how the system works, management must understand how each of the subsystems work and how their work effects the system as a whole. According to systems management theory, no manager, department, division, individual or organization is entirely independent of the others, and changes in any one subsystem will have consequences for other subsystems as well as the system as a whole. Effective management must understand how changes within the organization effect all the parts (Wren, 1987).

Contingency Management Theory

This theory, also called situational management, is a byproduct of the systems approach, and is based on the premise that the actions of management will depend on the particular situation and its variables. The contingency approach begins with an analysis of the problem, listing the prevailing circumstances, listing possible courses of action, and the consequences of each action. Viewing each problem or situation individually, it looks for the most effective way of finding solutions. The contingency theory is an integrative approach and incorporates the classical, behaviorist, quantitative, and systems theories to analyze problems and find the best approach for the unique situation. For example, one problem may be with people and require a behaviorist approach, and another may be with production equipment and require a quantitative approach and so forth. (Wren, 1987)

TQM in Business, Industry and Health Care

Introduction

Gradually, with the advent of standardized mass production, the time, pride and skill that the hand craftsman had put into the product disappeared. The manufacture of interchangeable parts created a need for control of quality. First, quality control was performed by an inspector who would inspect all parts coming off the assembly line. In early 1930's W.A. Shewhart, a statistician proposed the idea of statistical quality control (Seymour, 1993). He contended that no two parts could ever be manufactured exactly the same and that some amount of variability always existed. Rather than postponing the quality inspection until the products had reached the end of the assembly line, Shewhart suggested to control the variability throughout the manufacturing process by using statistical sampling and analytical techniques. During the 1940's and 1950's statistical quality control became a discipline in colleges and universities, however, it was mostly confined to the factory floor and consisted of only statistical functions.

During the 1950's W. Edwards Deming took statistical quality control a bit further to include more than just the factory. He took a systems view of quality control and claimed that quality control should be practiced from the design of the product through the whole system until the product reaches the customer. Later this concept was further broadened to include consumer research, human resource management, and other organizational issues beyond production.

Following WW II, America was a place where resources were plentiful and products were scarce, and many companies prospered by mass production of low cost, mediocre products. For nearly three decades, beginning in 1950, American manufactured products had the largest international market share of any country (Deming, 1986; Gitlow & Gitlow, 1987; Seymour,

1993b). In 1980 the U.S. had a 60% share of the international market on computer chips and General Motors had a 54% market share on cars. By 1989, those percentages had dropped to 10% and 35%, respectively. In 1976, seven percent of this nations' automobiles were imported and in 1989 thirty percent were imported (Chaffee, 1991-1992). Thirty years ago, the market was a sellers market and anything produced could be sold. Any country in the world was considered privileged to buy American products and American industry concentrated on production, without consideration of the buyer.

The condition of American industry today is far different from that of twenty years ago. The economy, lifestyles, culture, and technology have all changed, and it is no longer acceptable or profitable to mass produce products of lower quality. Today, American products and services face strong competition, both nationally and internationally, from products and services manufactured and offered by other nations. Consumers also have become more quality and cost conscious. All of these changes have set off a quality movement in the U.S. Though quality improvement philosophies were initiated much earlier, the movement toward quality improvement of products and services in the United States did not begin until about 1980.

In a world where just twenty years ago "made in Japan" was a sure sign of a second-rate product, today Japanese products lead the world in several industries. In contrast, national and international market shares of U.S. products have declined drastically. The ability of some industries to do "better with less" is largely responsible for this turn around. Perceived or real, quality is the culprit responsible for this change. In the new era, consumers are demanding higher quality products and are willing to pay more for them. Organizations that are able to propagate will be the ones that survive. Any organization that lags behind or ignores societal changes will eventually be overrun by its competitors.

Four major leaders in the quality movement are W. Edwards Deming, Joseph Juran, Philip Crosby, and Masaaki Imai (Crosby, 1984; Deming, 1986; Gitlow & Gitlow, 1987; Imai, 1986; Logothetis, 1992; Corenosky et al., 1992; Seymour, 1993). Their quality improvement philosophies are identified by several names including Total Quality Management (TQM), Total Quality Improvement (TQI), Quality Control (QC), Total Quality Control (TQC), and Statistical Process Control (SPC). These philosophies are usually referred to by their acronyms (Deming, 1986; Hyde, 1992-93; Jordan, 1992-93; Logothetis, 1992; Gitlow & Gitlow, 1987). Deming, the pioneer of the quality movement, suggests that the root of the quality problem in America is the style of management. He states "The basic cause of sickness in American industry and resulting unemployment is failure of top management to manage" (Deming, 1986, p. ix).

Deming is calling for a cultural transformation in the workplace, a new way of thinking about the responsibilities of employees and management. He contends that management today has robbed employees of their pride in workmanship and replaced it with fear. Workers feel powerless and are not encouraged to point out problems in the system, so they continue to perform work that they may know is not top quality. Most people don't like their jobs and hate to go to work and their work has little meaning for them. Deming believes that in order to ensure success in the marketplace, everyone in the whole system has to win, the company, customers, employees, suppliers, and the community. Any win-lose situation in which one group gains due to the losses of another will be less than optimal.

Deming calls for management to give workers back their pride in workmanship and responsibility in their jobs, to put the meaning back into work and improve the quality of work life. Management needs to realize that home life and work life are intertwined and work life should serve to fulfill higher order needs instead of being a meaningless activity off to the side

that one performs for a few hours a day. Unlike Frederick Taylor's ideas and similar to McGregor's Theory Y, Deming contends that human nature does not dictate that people hate to work, and he asserts that if the work has meaning, is satisfying needs, and allows for pride in workmanship, people like to work.

Deming's approach to managing quality improvement is largely responsible for the quality reputation of the present Japanese industry. His ideas encompass both the managing of human resources and the importance of statistical control of variation that leads to continuous quality improvement. Deming offers 14 points that if accepted and followed will lead to a process of continually improving quality, while concentrating on customer satisfaction, empowering employees, restoring pride in workmanship, and taking a long term view of the organization and its purpose. In addition, he explains what he calls the "seven deadly diseases" and several obstacles that inhibit successful transformation to the new philosophy of management. Although applied by a few organizations in the U.S. and the U.K. as far back as the 1930's, Deming's philosophy for managing for quality has been practiced extensively, successfully, and on a wide scale in Japan for several years (McCullough, 1988; Gitlow & Gitlow, 1987; Deming, 1986; Cornesky et al., 1992; Logothetis, 1992; Walton, 1986).

Deming's 14 Principles for Transformation

The 14 points of Deming's philosophy, described below, are the basis of his theory of managing for quality.

1. *Create constancy of purpose for continual improvement of product and service.*

An organization should have a mission statement in place that spells out where a company stands on the issues of quality, innovation, services, products, customers, employees, investors, suppliers, the community, and other issues important to the long term existence of the entity.

The mission statement should be more than a document, consisting of a few broad sentences, that just occupies space in the archives. Companies and their employees need to believe that they will be in existence for a long time to come and plan for it. One way of living this idea is to have long term goals about what the organization will achieve in the future. These goals should unify the entire organization and guide day-to-day decision making. Organizations should not get so caught up in today's problems that they fail to plan for the future. Long term planning can help assure that the organization is in business 20 or 30 years into the future.

Creating constancy of purpose also means making a long term commitment to employees. Every effort must be made to place employees in appropriate jobs and to ensure proper training and education for the job. In addition, employees should be able to expect that long term existence of the organization also means long term employment for them. The mission statement should be a "living" document, to which the organization should adhere. Every employee within the organization should understand how his/her position fits into the achievement of long term goals. To ensure constancy of purpose an organization should invest in innovation, techniques, new skills and materials, education and research, continuous customer research, and continuous improvement in product and service. Continuous customer research is essential for an organization to stay in business. Customer research should focus on the needs of the customer prior to product or service design, as well as follow up research after the product or service has been sold.

2. *Adopt the new philosophy.*

Central to the new philosophy are the issues of quality and customer satisfaction. Quality is defined by the customer, and a quality product or service is one that surpasses needs and expectations. Organizations should adopt the philosophy of continuous improvement and do

more than just attempting to meet the competition. The belief that the only way of increasing productivity is to increase quantity should give way to the understanding that higher quality costs less, and when quality improves, productivity increases. We now live in a global marketplace where people have choices. Mistakes, defects, poor workmanship, and services that are careless, inattentive, sluggish and incomplete are no longer acceptable. Attempting to increase productivity by stressing quantity instead of quality only results in a higher production of defective items.

The management-worker relationship is one of interdependence. Adopting the new philosophy should start with the examination of current operating attitudes to determine if they support or inhibit continuous quality improvement. People that harbor inhibiting attitudes have to be persuaded to change. In the new economic age, an organization should seek ideas and input from all sources, both within and outside the organization. Management should increase quality consciousness by involving everyone, from employees to the public liaisons of the organization, in never ending improvement of quality. Commitment to quality, pursuit of never ending improvement, and striving to exceed the customers' expectations should become the culture of the organization.

3. Cease dependence on mass inspection.

Organizations need to change their attitude from one of defect detection to that of defect prevention. Quality should be built into the product or service at the design stage and should continue through production. Routine mass inspection at the end of the production line is not only expensive and unreliable, but also is the same as planning for defects. Quality improvement should start from the raw materials that go into the process and continue throughout the production line by means of statistical sampling at appropriate points of the process. In most

production processes this would eliminate the need for a 100% inspection at the end of the process.

Most inspection systems, in which items are inspected only at the end of the production line, allow no corrective feedback into the process and inspecting products solely for the sake of inspection is a waste of time. Defective parts have already been made and must be scrapped or reworked. Inspecting the same items hour after hour is boring, and the efficiency of inspectors inevitably would decline, thus, allowing defective products to pass inspection. The cost of producing defective items and then reworking them or disposing of them is tremendous. Besides the direct cost of the defective items involved, there are long term costs associated with defective products passing the end of the line inspection, and therefore, loss of consumer trust and consequent future business due to poor organizational reputation.

4. End the practice of awarding business on the basis of a price tag alone.

"Price has no meaning without a measure of the quality being purchased" (Gitlow & Gitlow, 1987. p.52). Organizations should change long ingrained attitudes that they should seek out the cheapest items to purchase. Awarding contracts, and purchasing equipment, tools, raw materials, or other supplies should be based on both the quality and the price. "Indeed, often low quality of the final product can be traced back to problems with incoming materials" (Walton, 1986, p. 63). Procurement made solely on the basis of price is not only costly to the long run existence of the organization, but also will eventually destroy the business of vendors and contractors that offer high quality products or services at a fair price. The U.S. government and state governments and agencies are examples of organizations that frequently award contracts to business based on the lowest price.

For each one item, organizations should search for a single, quality conscious, dependable, well established supplier who exhibits financial, labor, and political stability. According to Deming, purchasing should be a team effort. The team should include the purchasing agent, the chosen supplier, the product engineer, manufacturing representatives, sales, and all other departments that might be involved with the product. The position of the purchasing agent in each organization is a multifaceted and demanding one. The agent should not only be aware of the techniques necessary for statistical quality control, but also have the skills to interact with other employees and customers to assess their satisfaction or dissatisfaction with the products and/or services and to communicate this information back to the supplier.

5. *Improve constantly and forever the system of production and service.*

Deming contends that improving the system is:

> continual reduction of waste and continual improvement of quality in every activity: procurement, transportation, engineering, methods, maintenance, locations of activities, instruments and measures, sales, methods of distribution, accounting, payroll, and service to customers. (Gitlow & Gitlow, 1987, p. 71)

Simply meeting minimum standards or specifications does not make a quality product, but only ensures the status quo. All system processes need to be continuously monitored for anticipation of problems and improved before a potential problem becomes chronic. Testing and retesting, using appropriate statistical techniques to reduce variation in the process, should be performed before and throughout production to ensure product quality. Management should take the responsibility of continually checking the entire operation, from the design stage to the final product. The goal should be continual improvement, so that not only the present expectations of the customers are exceeded, but also customers' future expectations are anticipated and fulfilled

through innovations. Quality improvement should not stop and should be based on the complete satisfaction of the customer.

Processes must be developed that will ensure the final product is what was intended. There is always a level of "common" variation, and as long as this variation exists, there is room for improvement. This idea deviates from the traditional management approach that as long as the specifications are met, the objectives are accomplished. The use of statistical methods and techniques is essential in controlling for variation and improving processes. The methods to use in any specific organization depend on the type of processes being monitored and a statistician would make the decisions regarding appropriate techniques. However, Deming emphasizes that depending only on the use of statistical techniques to achieve improvements is a sure way to failure. To succeed, a company should practice all fourteen points.

6. *Institute training.*

All employees need to be trained regarding their job duties. Statistical charts should be utilized to determine the performance of each employee. These charts could be used to both identify whether or not an employee has received enough training and to let employees know when they have performed their jobs properly. Once one's performance is within the accepted control limits, training efforts should be shifted toward new methods and techniques. Job training, however, goes further than just training in specific duties. It should include the broad picture of why the organization is in business and how a person's job fits into the overall mission. Specifically, each employee should be trained in the customer's needs and know in what processes his/her work is being used by their customer.

Training needs to be continuous and must include training in the TQI philosophy. In today's technological world, changes are always taking place in methods, materials, designs, and

many other things that effect the employees' work. Continuous training programs will ensure that everyone is always at the forefront of new technology. Other positive results of training include improved quality because everyone knows their jobs, employees feel more secure in their jobs, conflicts among workers are reduced since everyone knows the boundaries of their jobs, workers take a sense of pride in their work, and overall job satisfaction is increased.

7. Adopt and institute leadership.

The responsibility of the supervisor is to lead, counsel, coach, motivate, and to help people learn from mistakes. It is not to judge, blame or instill fear. The supervisor should be supportive, sympathetic, encouraging, a promoter of team work and should actively and openly participate in improvement activities. An ideal leader will statistically monitor the performance of workers and provide feedback on how they may improve, but will not use data to judge or create fear in an employee. In any group of people, half will be above average and half will be below, and managers must learn to appreciate the variety among people and use it to advantage.

Supervisors/managers should be thoroughly trained in the job or activities over which they supervise. Deming notes "people come into a company from college, learn about the company by going in and being supervisors somewhere. Pity poor people that have such supervision. No help at all! Aren't they entitled to some help? . . . There is no such thing as supervision, and should not be, unless people know how to supervise" (Walton, 1986, p. 71). In order for others in the organization to take continuous improvement seriously, management has to be visibly involved in the effort. Most importantly, management is responsible for the system and mistakes that happen because of system failure. Problems with the *system* are not in the control of the employees and they should not be blamed for these problems. Support for

continuous improvement must come from top management down to the supervisors who will show that same support to front line employees.

8. Drive out fear.

Fear is the cause of enormous waste and in the presence of fear none of the 14 points can be carried out. People cannot perform their jobs effectively if they are in constant fear of losing their jobs because of finding mistakes. Lines of communication should be kept open and employees should be encouraged to report any problems in the system. This can only be possible in an atmosphere of total security. According to Deming, the majority of employees, especially those in the managerial positions, neither understand the job nor do they know what is right or wrong. Many of the employees are afraid to ask questions or take a position. Fear often arises from the feeling of powerlessness and when employees are empowered fear is replaced with cooperation, mutual trust, cohesiveness, and team work. Employees should feel that they and their ideas are important for the company. Once the employees are not afraid to ask questions and express their ideas, a better understanding of the job and improvement will ultimately follow.

9. Break down barriers between staff areas.

A significant amount of waste results from the failure of departments within an organization to communicate with each other. Employees often perform halfheartedly when administering policies that have been drafted without their input and with which they disagree. All departments within an organization and all employees within each department should work as a team to ensure that their efforts are toward the overall goals of the organization. According to Deming, although an employee's performance within a department may be superior, if the goals of different departments are in conflict, the employee's superb performance can ruin the organization. Programs should emphasize contributions of individuals and departments that will

move toward the common goals of the company rather than efforts that support individual or isolated departmental goals. Evaluation methods should also emphasize contributions to the company as a whole to help eliminate competition between individuals and departments.

10. Eliminate slogans, exhortations, and targets for the workforce.

Slogans, exhortations, and targets, often employed in the Management by Objectives (MBO) method, can do nothing to increase production when the problems are in the system. In fact, this approach to increasing productivity is humiliating and assumes that employees could do better if they only tried. As long as employees are not given appropriate equipment, tools, materials and supplies, and the necessary environment to do a job, they cannot be expected to increase performance. Deming believes that given their training and the system in which they work, employees are doing the best that they can do. The system is the responsibility of management, and if management wants increased productivity, it has to provide the methods to accomplish the task. Pressuring employees to try harder without providing the means will only decrease motivation, instill fear, and cause workers to resort to inappropriate means in attempting to reach expectations. This ultimately leads to an increase in defective, low quality, or otherwise unusable output. If productivity could be increased simply by initiating a slogan of "increase productivity by 10%", then productivity could be increased easily every year by 10, 15, or 20%. Posters of slogans and targets should be replaced with posters of feedback of progress made toward improvement or meaningful statements that can be used by a worker to improve his/her job.

11. Eliminate numerical quotas and goals

Goals and quotas that focus on quantity instead of quality simply encourage mistakes and defects and lower morale. Many times these targets are beyond the capability of the system and

in fact, often management is not even aware of the maximum capability of the system. In order to reach quotas, workers may work faster, leave out necessary steps or perform incomplete tasks to speed up production. The performance of the average worker is generally the basis for setting quotas and rates. This lowers the morale and is humiliating for both the above average worker and the below average worker. The above average worker feels pressure to maintain or lower his/her rate so as not to raise the average, and the below average worker is frustrated by the pressure to reach the quota. Quotas also have the effect of increasing costs through time wasted. Often when the quota for the day, month, or other specified time period is reached, there is no incentive to produce more if time remains. Also, if production for a period does exceed the quota, the excess output is often hidden for a day when the quota may not be reached. The attainment of a target or quota is not a sign of success because there is always room for improvement in the system.

Another demoralizing practice is payment or other rewards based on how many pieces are produced. Workers soon learn that they are paid per piece regardless of whether it is a defective piece or not. They see that their work must not be important and eventually they are robbed of their pride in workmanship. The work becomes a meaningless task. Rewards based on piecework, arbitrary quotas, and targets cause conflicts between employees, lower morale, and decrease pride in workmanship.

Goals are a necessity, however, they should not be arbitrary without knowledge of what the system is capable of producing. Deming contends that 85% of the production problems are as a result of the system and only 15% are in the control of the workers. Management is responsible for the system. Only with proper statistical data and techniques can the system capability be understood and then goals can be made to stabilize the system. After a system

reaches stability, there is no advantage to setting a goal or target. Further goals should focus on improvement of the system because in a stable system production will remain the same, no matter what, until improvements in the system are made.

12. Remove barriers that rob people of pride in workmanship.

Employees should be aware of the mission and the goals of the organization, and need to be informed of how their work contributes toward the attainment of those goals. Everyone through all levels of the organization should be empowered and allowed to take responsibility for their work. They should be allowed to participate in decision making that effects their job and contributions of innovative ideas should be encouraged and taken seriously by management. Employees are the most valuable resource that a company has and they should be respected for their contributions. A person who feels that his/her job is important will make every effort to be on the job and to do their best work.

Dr. Deming contends that workers are well aware that their job is dependent on the success of the company. Also, they know that the success of the organization depends on the quality of their output and their productivity. People do not gain satisfaction when they cannot do their best. Working in conditions in which employees have no choice but to use low quality inputs, work with defective equipment, and maintain quotas decreases pride. If management doesn't care about the quality of what is produced, then employees won't either.

13. Encourage education and training.

Employee training and education in Deming's theory encompasses a much wider range than job training as it is currently practiced in American organizations. According to Deming, the training program of an organization should include, but not be limited to, educating the employee in the mission and goals of the organization, the employee's job requirements,

statistical techniques, and new methods relevant to any aspect of the organization. He even suggests that the training program should support the employee in acquiring basic skills such as math, writing, and communication skills. The objectives of such a training program, Deming believes, is to help the employee undertake new positions and responsibilities as some of the old positions disappear because of improved productivity. This will reduce employee burnout and anxiety.

14. Take action to accomplish the transformation.

Management should build a structure that will push the implementation of the preceding 13 points. Making sure that all employees understand and are committed to the new philosophy is a start. Each organization has to develop an implementation plan that spells exactly how implementation efforts will proceed. A team spirit should be encouraged early in the effort as should introduction to the necessary statistical methodology.

Deming's Seven Deadly Diseases

In addition to his 14 principles, Deming names what he calls seven deadly diseases and several obstacles that often stand in the way of a company's successful implementation of the TQI philosophy (Deming, 1986). The diseases differ from the obstacles in that they are harder to eradicate and are more severe. The diseases are as follows:

1. Lack of constancy of purpose to plan for products and services that will have a market and keep the company in business. Too many companies insist on running their business from quarter to quarter rather than planning for the long term.
2. Emphasis on short-term profits and short term thinking. Emphasis on short term profits defeat constancy of purpose. Which is more important, a large dividend today or that there be dividends three or five years from now?

3. Performance evaluations, merit ratings, or annual review. Periodic performance evaluations are typical of Management by Objectives, management by numbers or management by fear. Appraisals encourage short term thinking, don't distinguish between the people and the system, increase variation in the system, destroy teamwork, build fear, are humiliating, and effect morale.
4. Job hopping or the mobility of management. Lack of commitment through frequent upward mobility of management results in new managers in positions who know little about what they are suppose to be managing. Managers don't stay in a position long enough to thoroughly learn the character and specific problems associated with that department or company.
5. Management's use of visible figures only without regard to figures that may be unknown or are unknowable. Not every gain or loss can be quantified in dollars. The most important figures are those that are unknown or are unknowable, but management must nevertheless make an effort to estimate them. They are the multiplying effect on sales from a happy customer or the negative effect on sales from an unhappy customer; the improvement in quality on down the line that comes from improvement of quality in one area (the ripple effect); improvement of quality from better training, better supervision, elimination of quotas, close customer supplier relationships, and teamwork; losses from assigning annual ratings and inhibiting pride in workmanship.
6. Excessive medical costs
7. Excessive liability costs

Deadly diseases 6 and 7 are peculiar to U.S. industries and are not discussed in detail by Deming.

Several obstacles to successful implementation of TQI noted by Deming are the hope that TQI is an instant solution, searching for examples, the attitude that its okay for others but our problems are different, obsolescence in schools, poor teachers of statistical methods in industry, leaving quality problems to a quality control department, blaming workforce for system problems, and piece meal implementation without taking the whole philosophy,

Juran's Quality Philosophy

Like W. Edwards Deming, another quality philosopher, Joseph Juran, was invited to Japan in the 1950's to help with Japan's economic recovery following WW II (Juran, 1988; Logothetis, 1992). Juran's quality philosophy is, in most ways, similar to that of Deming, however, there are some important differences. Juran's writings, to some extent, are influenced by a variety of careers, including management consulting, that he has undertaken throughout his life. His writings, therefore, tend to be more supportive of traditional management practices than Deming's writings, and he stresses improving current management practices rather than transforming management. Juran's type of quality improvement effort allows management the feeling of still being in control.

There are many similarities in the basic tenets recommended by Deming and Juran, and often their ideas are complementary. Broadly speaking, Deming is responsible for the theory, while Juran offers procedures for putting the theory into practice. Juran is more concerned with specific implementation techniques and less concerned with the ideology underlying the techniques may work. Deming and Juran have similar opinions regarding top management's responsibility for the system and improvement; existence of a quality crisis in America, the

importance of both external and internal customers; the importance of quality for survival in today's market; and the use of scientific tools and techniques. Like Deming, Juran also places emphasis on identification of causes of problems and rejects exhortations without providing the means to achieve. Similarly, Juran believes in heavy investment in training (Logothetis, 1992).

Juran insists on emphasizing results to be achieved, and according to him, the "recipe for action should consist of 90% substance and 10% exhortation, not the reverse" (Juran, 1988, p. 3). In order to achieve the intended results, he postulates the following steps, which are often referred to as Juran's formula for results.

Establish specific goals to be reached

Establish plans for reaching the goals

Assign clear responsibilities for meeting the goals

Base the rewards on results achieved

Juran sets forth a trilogy of management processes for managing and improving quality. This trilogy consists of (1) quality planning, (2) quality control, (3) quality improvement (Corenosky et al., 1992; Juran, 1988; Logothetis, 1992).

Quality Planning

Juran contends that quality problems are the result of poor planning, and in order for quality to happen, it must be included in the plans. The purpose of planning for quality is to provide the necessary means for producing a quality product, one that meets the needs of the customer. Following are his steps to quality planning (Juran, 1988, p. 14).

1. Identify the customer(s) and their needs.
2. Translate the customer needs into a common language that everyone can understand.

3. Develop a product that can respond to those needs.
4. Optimize the product to meet the needs
5. Develop a process to produce the product and optimize it
6. Once process is proven as optimal put it into operation

Quality Control

Juran defines quality as "fitness for purpose". Such a broad definition is of little use unless some type of quality specifications and/or standards are established. It is essential that specifications be drawn up for a performance level that meets the requirement of fitness for purpose. Therefore, conformance to specifications becomes the test for quality.

Once the quality specifications are in place, the process of controlling quality will begin. Quality control is ensuring conformance to the specifications and taking corrective action as soon as deviations are discovered. Immediate correction of what Juran calls sporadic special problems, or "fire fighting", is required in order to return the process to the status quo. At this point the process is said to be in control, and attempts for improvement of the process can be put into motion. These process improvement efforts are aimed at reducing what he identifies as chronic waste that results from common causes of variation in the system. Common causes of variation are inherent in the process and can only be improved by improving the process. Juran is in agreement with Deming that 80% of the causes of variation are in the system, and thus are the responsibility of the management, whereas workers have control over only 20% of the variation.

Quality Improvement

A quality breakthrough is achieved when substantial process improvement takes place, chronic waste is considerably reduced and a new level of control is reached. Quality breakthrough is defined as "a change, a dynamic, decisive movement to new, higher levels of performance" (Juran, 1964, p. 2). It is an improvement in the process that takes the company to an unprecedented level of performance. Juran stresses the importance of making annual improvements in quality and reductions in quality cost in order to make quality improvement a habit. To achieve a breakthrough, he offers a sequence of seven steps, which is referred to as a universal breakthrough sequence:

1. Proof of need. Management must translate defects, scrap, and waste into an amount of monetary loss. Most people don't pay attention to, or cannot understand, losses associated with waste unless they can see a value that measures the loss.
2. Project identification. Specific projects and clear responsibilities need to be identified and clearly assigned. Various methods for prioritizing projects are available, and the one recommended by Juran is the Pareto chart. Most projects will follow the 80/20 rule in which 20% percent of the problems will account for 80% of the losses. These are the problems that should take priority.
3. Organization for improvement. In this stage, Juran identifies three activities that are fundamental in organizing any improvement program. The activities are (a) guiding the overall improvement program, (b) guiding each individual project, (c) diagnosing/analyzing each project. For each activity, clear responsibilities are to be assigned for carrying out the activity. He suggests, that a team of upper management be created to guide overall improvement, while subcommittees be appointed to

facilitate the other two activities. However, unlike Deming who believes in the involvement of every employee, Juran places a lesser emphasis on the role of the hourly worker and assigns more of the responsibilities to middle and upper management.

4. The diagnostic journey. Juran refers to this stage as the journey from symptom to cause. The problem or defect has been identified and the search for the cause begins. Keeping in mind that there are operator-controllable defects and management controllable defects, causes are identified through data collection, analysis, experiments, and interpreting results.

Juran makes several suggestions regarding how operator-controllable defects can be remedied. Two of these which tend to be in opposition to Deming's teachings are: (a) establishing accountability and traceability to the worker who is causing the defect because anonymity is a temptation to irresponsibility, and (b) creating positive competition. The former suggestion would be interpreted by Deming as instilling fear and it would also infer that people inherently don't like responsibility, which has been disputed by several theories (Deming, 1986; Herzberg, 1959; Pollard, 1974; Cullen & Hollingham, 1987). Regarding the latter inference, Deming is against competition and believes that it discourages team work.

5. Remedial action. In this stage corrective action is taken for the management controllable causes, diagnosed in stage 4, which will help improve the total process and bring it to a new level of control. The steps involved include choosing a remedy from several alternatives, establishing preventive actions for the future,

communication to all departments so they can provide feedback, allocating responsibility for action, inspecting and testing.

6. Resistance to change. Resistance to change among employees can be a major factor in inhibiting the implementation of corrective actions. Several factors including beliefs, values, attitudes, traditions, and fear of the unknown, can contribute to the resistance of individuals to accept change. To help with alleviating some of the resistance, Juran recommends providing opportunities for those affected by the change to participate in planning and execution of the change. He also suggests providing people with enough time so that they get used to the change, and accept it, before implementing it.
7. Holding the gains. The new remedy, once implemented, must be monitored to ensure that operations are in line with the new standards and a slip back to the old level of operation does not occur. This involves evaluating current performance, comparing it to what it should be considering the gain, and taking corrective action if needed.

Crosby's Quality Philosophy

Philip Crosby (1984, 1988) defines quality as conformance to customer requirements and believes that the system of quality is prevention. He uses the metaphor of a sick person with a disease to describe a company that has problems with quality. The disease is nonquality, and companies who may have the disease exhibit certain symptoms. According to Crosby five symptoms of a company that has problems with quality are (Crosby, 1984, p. 1):

1. The outgoing product or service normally contains deviations from published, announced, or agreed-upon requirements.

2. The company has an extensive field service or dealer network skilled in rework and resourceful corrective action to keep customers satisfied.
3. Management does not provide a clear performance standard or definition of quality, so each employee develops his/her own.
4. Management does not know the price of non-conformance.
5. Management denies responsibility for problems.

Crosby renders four basic concepts of the quality improvement process that he terms the Four Absolutes, and like Deming, he offers 14 steps for quality improvement (Crosby, 1984) . The Four Absolutes answer the four questions: (a) What is quality? (b) What system is needed to cause quality? (c) What performance standard should be used? (d) What measurement system is required? These absolutes are:

1. *The Definition of Quality is Conformance to Requirements.* Management must establish requirements that employees need to meet and supply the means for meeting the requirements, as well as provide necessary help and encouragement. Everyone should perform based on requirements and not on opinion or experience alone. However, it is imperative that experience and intelligence be built into the requirements when they are established. All of this must be undertaken in conjunction with a "do it right the first time" policy.
2. *The System of Quality is Prevention.* Crosby states "unfortunately, no one is against preventing; it's just that they don't have time right now" (Crosby, 1988, p. 223). Prevention, and not end inspection, is the artery to quality. End inspection is expensive, unreliable, and comes too late to make improvements. Prevention, on the other hand, involves looking at the process and identifying potential areas of errors,

however, a system of prevention compels everyone to understand the process. Statistical quality control techniques aid in the system of prevention by identifying the variation within processes and detecting when a process may move out of control.

3. *The Performance Standard is Zero Defects.* The Crosby philosophy stresses the importance of doing things right the first time and introduces the concept of zero defects (ZD) as a management performance standard. Zero defects indicates that there is no room for a "that's good enough" attitude. Crosby insists that "zero defects" is not a slogan or a motivational tactic, but it is simply a management standard that informs employees what is expected of them. Some quality leaders have attacked this idea as being impractical and impossible, however, Crosby believes that mistakes are caused either by lack of knowledge or lack of attention. He surmises that lack of knowledge can be remedied through training and education, and lack of attention is a problem with attitude that must be corrected by the individual.

4. *The Measurement of Quality is the Price of Nonconformance.* Monetary terms are easily understandable for top management, thus, rather than viewing quality in relative terms, as a degree of goodness, it should be measured in monetary terms. Crosby further postulates that the cost of quality has two parts - the price of conformance and the price of nonconformance. The price of conformance is what must be spent to do things right, and it generally represents 3 to 4 percent of sales, in a company that is well-managed. The price of nonconformance, on the other hand, is the cost of doing things wrong and can range from 20% to 40% of the total operating costs (Crosby, 1984, 1988; Juran, 1988).

Crosby's 14 steps for quality improvement are (Crosby, 1984):

1. Management commitment. Like many of the other quality experts, Crosby makes it clear that quality efforts must be visibly supported from the top management.
2. The quality improvement team. Cross functional teams consisting of representatives from all organizational functions should be established to guide the quality improvement process. They should be responsible for establishing educational or training programs in order to change attitudes of individuals and get everyone working for quality improvement.
3. Measurement. A clear method of measurement is needed for each part of every activity, the input, the process, and the output. In addition, it is important to establish baseline data for a means of comparison as quality is improved.
4. The cost of quality. Although Crosby does admit, like Deming, that many costs are not calculable, he deems it necessary to put the cost of quality in objective terms in order to get the full attention of management.
5. Quality awareness. Everyone in the company should be aware of the importance of quality. Crosby believes that it is essential to tell employees about the cost of not doing things right the first time. To help remind employees about quality, he does not oppose slogans such as "zero defects" or "do it right the first time".
6. Corrective action. Corrective action serves the purpose of identifying problems and creating permanent solutions. Crosby makes a strong point that corrective action is not redoing someone else's work that was not done correctly the first time. He deems that corrective action can only be taken on a system that is in control, and that the action should be based on statistical data and analysis.

7. Zero defects planning. The concept of ZD needs to be planned in advance. Top management has to show that they are committed to ZD. Crosby suggests that in planning for ZD suppliers, customers, and other stakeholders should be involved.
8. Employee education. All employees need to be trained in the TQI philosophy. Crosby's method of education requires approximately 30 hours of classroom instruction which should contain what he calls the six Cs: comprehension, commitment, competence, communication, correction, and continuance.
9. Zero defect day. ZD day is an annual occasion, involving the organization and the public at large, in which top managers announce their commitment to quality. The purpose of ZD day is to serve as an annual reminder of the importance of quality.
10. Goal Setting. As soon as the organization begins to gather data and measure improvement, targets should be set. The absolute goal is ZD.
11. Error cause removal. This step encourages employees to seek out errors that may result in defects and eliminate the causes of these errors in the processes.
12. Recognition. A recognition program for good employees is a necessity, although like Deming, Crosby does not believe in merit pay. The individuals who should be recognized are chosen by their peers as representing the ideal example. The recognition, however, does not have to be monetary.
13. Quality council. The quality council consists of professionals in quality improvement from within the organization coming together in order to focus on quality issues and exchange ideas.
14. Do it all over again. The quality improvement process is a continuous one. Like Deming, Crosby believes that quality improvement is a never ending journey that

takes a long time to instill. The cultural change required involves changing attitudes resulting from deeply ingrained values, and is not a transition that can be accomplished over the short term.

Kaizen

Kaizen, developed by a Japanese business man, Masaaki Imai (1986) is a concept that incorporates the quality management theories, philosophies, and tools, used by the Japanese businesses over the years. Kaizen means continuous improvement involving all employees. However, Kaizen philosophy goes beyond the working environment and advocates ongoing improvement in all aspects of one's life including work, personal, home and social life. The Kaizen principles are to a great extent influenced by Deming's ideas and are in many ways similar to his philosophy. Kaizen is process oriented as opposed to results oriented and is defined as "ongoing improvement involving everyone" (p. xxix) from top management down to the front line worker. The basic axiom of the philosophy is that improving processes is a team effort that should take place constantly, gradually, and in small increments, and as processes improve, results will improve automatically. Once an improvement is made, standards are revised to reflect the improvement, thus, the improvement is maintained through everyone following the new standard while awaiting further improvements. The process of making improvements and revising standards continues, with an ultimate goal that it will lead to customer satisfaction, something that Kaizen deems essential in order for an organization to survive.

Kaizen begins by recognizing that all organizations have problems and establishing an environment in which everyone feels comfortable calling attention to these problems. Japanese management goes to great lengths to solicit suggestions from employees. The belief is that every individual is able to, and should be allowed to, contribute to improvements in the workplace, the

environment in which one third of the life is spent. In a Kaizen organization, all suggestions are taken seriously and given consideration as to how they may be incorporated.

The use of cross functional teams in solving problems is a very important contributing factor to Kaizen success. Rewards and recognition are based on team efforts toward improvement, and not just on the end result achieved. The supposition is that rewarding effort, even though the end result may be unchanged, is very consequential in keeping individuals working continuously toward solving problems and making improvements. Similarly, Japanese sports awards are given for outstanding performance, skill, and fighting spirit even if the winning record is disastrous. According to Kaizen principles, management practices that reward only the end result do not reward the contributions of many hard working people without which the positive end result may not have been achieved.

Japanese managers look at organizations as having one of three types of management, maintenance, Kaizen, or innovation. Maintenance management involves maintaining the status quo of the organization. Kaizen entails making small, frequent, incremental improvements. Innovation is a drastic improvement resulting from a large investment in technology and/or equipment. For the company that practices it, Kaizen bridges the gap between maintenance and innovation. Innovations occur only occasionally, so instead of simply maintaining the status quo until an innovation happens, Kaizen companies make gradual improvements along the way until an innovation can occur. On the contrary, most Western companies using traditional management just maintain the status quo and wait for an innovation. Innovations usually are very profitable at first, but are short lived unless constant improvements are made.

As with the Deming philosophy, Kaizen strongly emphasizes the use of facts and data for decision-making. The Kaizen concept regards customer complaints not as troublesome, but as

valuable data to be used in making improvements. All managers and workers should be trained in the proper use of analytical tools for data collection and analysis. However, Kaizen experts warn that using data will be of no use if the data are inaccurate or are not used and interpreted properly. Similarly, proper channeling of data is imperative so the data can reach people to whom it is meaningful and who can use it in a process improvement.

A fundamental prerequisite to Kaizen is creation of a cooperative culture. Achieving an atmosphere in which workers have overcome their resistance to change and are acceptable to new methods and ideas requires (p. 217):

1. Constant efforts to improve industrial relations
2. Emphasis on training and education of workers
3. Developing informal leaders among the workers
4. Formation of small-group activities
5. Support and recognition for workers' efforts
6. Conscious efforts to make the workplace a place where workers can also pursue life goals
7. Bringing social life into the workplace as much as practical
8 Training supervisors to communicate better with workers
9. Bringing discipline to the workplace

Lawrence Tobin (1990) in his article The New Quality Landscape identifies several ways that TQI differs from traditional management practices.

1. Customer focus vs. Management focus; The purpose of any business activity in the TQI organization is to satisfy the customer. The notion is that customer satisfaction will ultimately result in long term profitability and survival. Although in many

companies, under traditional management, the notion of customer satisfaction is entertained, decisions are made for the convenience of the company.

2. Quality first vs. Profits first; Some companies don't yet realize that the quality of the product should come first before any other business needs. Producing low cost products or providing services that are of low quality may satisfy short term profits but will soon lead to customer dissatisfaction and ultimately organizational failure. Traditional management views profit making as its foremost responsibility.
3. Multiple quality dimensions vs. Single quality dimensions; Quality is a multifaceted concept that has various aspects. Different customers have different needs that must be assessed. One customer cannot define quality for everyone else, and a company may have to meet more than one aspect of quality in order to meet the needs of all customers. In traditional management, quality control usually has no relationship to the customer needs. Often standards are set by the management and once a product meets those standards, it is produced. Such a product may function according to the standards, but may have no buyers.
4. Management and worker involvement vs. No worker involvement; In a TQI company, all available resources are used and everyone puts forth effort toward quality improvement. Employees are empowered and encouraged to participate. In traditional management, however, workers work and managers manage, leaving little room for them to work cooperatively.
5. Process oriented vs. Results oriented; The process oriented management approach improves quality through long term, incremental improvements in processes and subsequent long term gains. Traditional management, in contrast, prefers the "Big

Bang" approach, a drastic improvement through innovation followed by a big boost in profits. Unfortunately these gains are often short lived, because no further gains result until another innovation occurs.

Tobin concludes by stating that implementing TQI requires a whole new attitude about customers, the organization, and its relationship to the outside world. TQI can cause positive changes in organizations if implemented properly, however, without full transformation, efforts will be doomed to failure.

Positive Experiences with TQI

Quality improvement theories have had a major impact on many manufacturing and service organizations throughout the world, but most recently in this country. Two companies that cite TQI for turning declining profits around are IBM and Xerox (Chalk, Edwards, & Eskind, 1992; Cullen & Hollinghum, 1987). In addition, other companies that have reported success with TQI include Ford, Kodak, Motorola, Jaguar Cars, The Hartford Insurance Group, and ITT Hancock Industries (Cullen & Hollingum, 1987; Leibman, 1992).

Realizing that businesses must wake up to international competition, IBM initiated a TQI effort in the late 1980's. Although still young in their implementation program, they have discovered that in order for their effort to succeed, leadership commitment from the top, a customer focus, and employee acceptance and participation at all levels are essential. In addition, IBM advises organizations that are seeking a pre-made, ready-to-implement TQI package, that their chance of failure is high. On the contrary, TQI is a set of basic principles that each organization must customize and translate into practice to fit that particular organization.

After deciding to initiate a quality improvement program, IBM found that about one third of the employees realized and accepted that external conditions had changed, and this, in turn,

meant that the company also needed to change. Leadership for this group of employees took the role of coaching and assisting people in what actions to take. However, the remaining employees did not see why the environment within the company had to change, and their attitudes were that the problem does not apply to them. The leadership role for these employees required heavy emphasis in persuading, and convincing, so that their resistance to change could be eliminated. IBM executives strongly believe that organizations cannot remain competitive unless the people who operate them are willing to change.

The experiences of the Xerox corporation with TQI implementation are similar to those of IBM. In the late 1970's Xerox attributed its dramatic drop in profits to the increase in Japanese competition. In an attempt to offset the loss, in the early 1980's the company desperately initiated a quality improvement program, and has seen a growth in profits every year since 1983. As at IBM, gaining top leadership commitment and involving all employees through education and training was the first priority at Xerox. Managerial responsibilities include giving one-on-one supervision, encouraging an environment of trust and openness, and playing the roles of coach, teacher, and facilitator. The cornerstone of Xerox's success is the notion that the center of every strategy and activity is the customer, and all processes are analyzed with the effect on the customer in mind.

The well-being of the employee is another important concern for Xerox, and it is deemed essential that each employee takes pride in the organization and feels responsible for its success. The company has an extensive employee survey that solicits the employees' perceptions regarding how well they are satisfied with different aspects of their job at Xerox. Three key statements included in the company's policy on TQI reflect their conviction toward the philosophy (Cullen & Hollingum, 1987, p. 4):

1. Quality is the fundamental business principle.
2. Internal as well as external customers must be satisfied.
3. Quality improvement is the job of every employee.

Another faction of business, the service sector, has also begun to experiment with TQI. One example of this is within the Health Care Industry. In a survey of 781 hospitals conducted by Hospitals magazine in the early 1990s, 60 percent of respondents indicated that they had a TQI program underway (Koska, 1992). Results suggested that senior managers and trustees were the most enthusiastic about the improvement efforts while the physicians were the least enthusiastic, even though 64% of them were involved from the beginning. Sixty-six of the 781 respondents indicated that they had implemented the quality improvement program hospital wide, with the remainder initiating implementation in one department at a time. Results also showed that TQI in the health care industry is still quite young compared to that in the business sector. Approximately 43% of the hospitals that had implemented TQI indicated that their efforts were just getting underway, while nearly 35% said they were in the early stages of implementation.

The Health Care Advisory Board reports that the most successful implementation efforts are those that involve the physicians from the beginning (Brigham, 1993). Hospitals that do not have physician involvement cannot make improvement initiatives for their critical core processes, including clinical quality and physician retention. Without physician participation, improvement efforts were nothing more than reducing patient waiting times or billing complaints, which while important, will hardly lead to continuous improvement of the core service of the organization.

Problems with TQI Implementation

Although there are companies which claim that their TQI efforts have more than paid off, other companies claim to have shown few positive results (Chan, 1993; Leibman, 1992; Lozier &

Teeter, 1993; Brigham, 1993; Harari, 1993). Statistics by well-known consulting firms like Arthur D. Little, Ernst & Young, Rath & Strong, McKinsey & Co., and A.T. Kearney have revealed that at best, only about one third of TQM programs in the United States and Europe have achieved improvements in quality, productivity, competitiveness, or financial returns while the remaining two thirds had failed to show any real improvements (Harari, 1993a; Lozier & Teeter, 1993). There are numerous articles that offer reasons for TQM failure, pitfalls in implementation, problems that hamper success, or other explanations for the failure of TQM to yield anticipated results (Leibman, 1992; Becker, 1993; Chang, 1993; Bailey et al., 1993; Fife, 1992).

Leibman (1992) identifies seven pitfalls to TQM implementation efforts.

Pitfall 1 *I've seen the light, now roll out the program*: Often when organizations hear about TQM they want it in place immediately. In a rush to implement a program, top managers will often purchase a ready made program and put it in place without taking the time to adapt the program to the specific needs of their organization. There are major differences between a manufacturing organization and a service organization, or even between two manufacturing organizations, and what works for one may not work for another. It is imperative that each quality improvement program be tailored to fit the particular organization.

Pitfall 2 *Train, train, train*: Organization wide training ensures that everyone has the skills and commitment necessary. However, management often becomes engrossed in the training, and accomplishments are measured in terms of how

many people are trained instead of measuring the quality improvement due to the training.

Pitfall 3 *The operation was a success, but the patient died*: Often management gets so over involved in creating teams, developing metrics, collecting data, and analyzing procedures, that it loses sight of the end reason for doing so, the customer. Improvements are made simply for the sake of change instead of for satisfaction of the customer.

Pitfall 4 *A wash with data*: In trying to specify problems, teams often take the wrong approach to research. Instead of formulating hypotheses and identifying appropriate research methods, they begin by collecting loads of data and making charts and graphs. Consequently confusion results with a stack of data and charts that have no beneficial use.

Pitfall 5 *Perpetuating cultural paradigms that impede quality improvements*: Management is often delighted to approve and implement the initial recommendations of the first problem solving team. However, subsequent efforts of addressing more substantial problems are stalled, because teams do not know how to address the core of the problems - the organizational factors that give rise to the problems in the first place. Thus problems tend to be solved only at the technical level.

Pitfall 6 *Team effort, individual rewards*: Traditional compensation methods have shown signs of being counter productive by creating tension and competition among employees and departments. Employees work in teams to improve processes, decrease costs, and satisfy customers, however, wage increase

criteria are based on individual performance. Frustrated, employees return to concentrating on individual performance rather than organizational performance in order to receive a higher raise.

Pitfall 7 *Great idea, but . . .*: At first, everyone seems enthused about beginning a quality improvement program, but after a brief period, enthusiasm wanes and efforts dwindle. Decentralization and empowerment become just hollow words with no real action to back up the ideas, and the constant need for approval remains with the old hierarchical decision making.

Harari (1993) takes a different view of quality and TQM. He contends that, although, quality and TQM sometimes converge, they are separate concepts and are likely to be at odds with each other for several reasons.

1. *TQM focuses people's attention on internal processes rather than on external results.* Focus on internal processes takes attention away from the customer. Thus a product may be efficiently well-made, but not remotely resemble what the customer wanted
2. *TQM focuses on minimum standards. TQM causes people to perceive that minimum* standards define quality, but, on the contrary, they do not. Quality is more than producing a well-made product and zero defects is only one small part of the customer's package. The concept of quality encompasses the customer's total experience with the organization.
3. *TQM develops its own cumbersome bureaucracy.* Quality improvement is not an orderly process, but, in fact, it turns the organization up side down. Many TQM programs assume that quality is an orderly process, thus the natural occurrence is that

an orderly bureaucracy will form around it, characterized by reams of paper, forms to be signed by 3 or 4 levels of managers, and other bureaucratic process.

4. *TQM delegates quality to quality czars and experts rather than to "real people".* Quality cannot be delegated and must be assumed and lived by every employee, but the first action of many programs is to appoint an individual as the director of quality improvement. On the contrary, everyone should be responsible for quality.
5. *TQM does not demand radical organization reform.* While TQM acknowledges that cross functional teams and communication with outsiders are needed, these things are not given noteworthy attention. The tough, painful, structural changes that are inseparable from TQM receive far less concern than the very visible wall posters, classes, motivational balloons, and presentations with fancy graphs.
6. *TQM does not demand changes in management compensation.* In most TQM companies, senior management pay continues to be based on profitability of the company, instead of on performance measures, defect rates, or customer satisfaction.
7. *TQM does not demand entirely new relationships with outside partners.* TQM is inner directed and does not lend attention to company relationships with outsiders such as suppliers and customers.
8. *TQM appeals to faddism and quick fixism.* Many TQM sellers present TQM as a quick cure all package. Companies subsequently implement TQM on this basis and try to use it as such.
9. *TQM drains entrepreneurship and innovation from corporate culture.* TQM standardizes and routinizes internal processes leaving no room for innovative thinking. In today's competition, routine means the demise of any company.

10. *TQM has no place for love.* TQM attempts to make quality happen by an analytically detached, mechanical path. The love of product, love of customer, and joy of creating is absent.

Additional evidence of dissatisfaction with TQM is presented by Lozier and Teeter (1993) who cite several studies in which results indicated that a majority of the responding companies were having little payoff from TQM. They point out several problems with TQM implementation efforts that may be responsible for the failure of TQM programs: reliance on packaged, off-the-shelf TQM programs; large scale, diffuse implementation with too much activity too soon; comprehensive, massive, and unfocused training programs; measurement paralysis characterized by too much data measuring the wrong things with inadequate analysis; overemphasis on TQM tools, forgetting that the tools are a means and not an end; focusing efforts on trivial processes instead of core processes; outmoded reward structures; and simplistic views of change and cultural transformation.

Chang (1993) lists five symptoms that he believes lead to a deficiency in measurable results for an organization's quality improvement efforts. They are: (1) rapid, widespread implementation with a rash of activities, (2) failure to select key processes (ones that can directly benefit customers and enhance operational performance) for improvement, (3) massive training without equating it to measurable improvements achieved as a result of training, (4) too many quality improvement teams without specific improvement goals, (5) and collecting and analyzing inappropriate process data. To cure these symptoms, he suggests: beginning with a narrowly focused approach and implementing gradually; isolating the top priority processes and targeting them for improvement; performing training on an as needed basis, coinciding with gradual implementation efforts; forming quality improvement teams gradually, using the success of in-

place teams for motivation of the new teams; and making certain to link internal processes measures to key indicators of customer satisfaction.

Brigham (1993) argues that in a 1992 Arthur D. Little survey, only 36 percent of the respondents reported that TQM had significantly impacted their organization. Some reasons cited for poor experiences with TQM include: lack of leadership commitment from the top; middle management's misunderstanding of or unwilling participation in TQM; misunderstanding of how participation should be facilitated; obsession with process while ignoring results; and failure to include the customer.

"Quality efforts fail because organizations attempt to implement TQM techniques without adopting the TQM philosophy" (Becker, 1993 p. 32). Total transformation of management culture is required and half-hearted measures will not be successful. In a study conducted by the Quality Improvement Company of Cupertino, California, 30 companies that were conducting extensive quality improvement training programs were analyzed (Ludeman, 1992). Results indicated that companies in the early stages of their quality improvement effort had significantly more support from managers and employees than companies whose programs had been in place for more than 18 months. Even in the case of improvement efforts that were initially successful, after a period of time, support and enthusiasm began to decrease. According to Ludeman, the reason for this phenomenon is that the necessary, permanent changes in attitudes, that lead to changes in lifestyle, did not occur. Changes in underlying attitudes and behaviors of managers and employees lead to lifestyle changes and without a permanent lifestyle change a quality improvement effort will eventually fail.

Another critical factor in successful implementation, cited by several authors, is the importance of targeting appropriate processes for the first improvement projects. No more than

three or four core processes should be chosen to begin the TQM effort (Ludeman, 1992). These should be the processes that have the most significant impact on the customers. To find out which processes are involved, customers need to be studied and surveyed as to their needs and service/product expectations.

TQI in Higher Education

Introduction

Some researchers claim that quality improvement is not only relevant to the factory, but can be successfully applied in other sectors, including higher education. Its basic tenet is simply encouraging people to work together, without fear, to improve, and be proud of what they have accomplished. The use of certain tools will boost movement in the right direction. TQI theory and the values of higher education converge in the areas of human resource development, lifelong learning, rational problem solving, and societal benefit (Chaffee & Seymour, 1991).

Higher education is facing several issues that will impact the quality of the education students are receiving and will receive in the future. Students are dissatisfied with services, governments are concerned with the rising costs of education, racial tension on campuses has increased, employees are dissatisfied with working conditions, tuition is increasing faster than the rate of inflation, and business is complaining that today's graduates do not possess the skills needed by industry (Jorgensen, 1992; Zook, 1992; Wilson, 1991; O'Donnell, 1993; Foval, 1993; Evangelauf, 1993). Since 1980 there have been record setting increases in tuition with the cost of a college education more than doubling during the 1980's. This rate of increase was higher than the inflation rate in every other sector of the economy including health care, which has also seen

recent dramatic increases. Public institutions raised tuition an average of 12% in the 1991-92 academic year (Meyerson & Johnson, 1991) and decisions to raise tuition between 6% and 10% in 1993-94, on campus across the country spawned student protests (Evangelauf, 1993).

Rising tuition is the result of rising operating costs coupled with decreasing revenues. For the first time in over 30 years, state funding for higher education decreased in 1991, and 75% of higher education institution presidents declare that rising costs and lower revenues is their biggest problem in the 1990's (Coate, 1992; Meyerson & Johnson, 1991). These facts are prompting the federal government to explore possible methods of persuading colleges and universities to control their cost. Neither the public nor lawmakers will tolerate further increases in tuition and new approaches to financial challenges are needed to keep a college education affordable.

Colleges and universities have learned that continually raising tuition in order to survive has its limits. In 1991 six colleges and universities closed their doors permanently and others are undergoing major retrenchment efforts. Institutions like Oregon State University and University of Oregon have closed major departments and even whole colleges, and Harvard University was forced to eliminate 850 positions in 1991 (Coate, 1992).

In response to the annual Agenda Priorities survey, leaders and trustees of higher education institutions listed (1) public opinion toward higher education, (2) state education policy, (3) regional and sector economic performance, (4) demographic trends, and (5) the recession as the top five concerns in higher education (Meyerson & Johnson, 1991). Some specific public criticisms include: (a) high tuition and too much emphasis on faculty scholarship and research but not enough on teaching; (b) high student loan default rates (20% in 1989); (c) low graduation

rates (49% of high school seniors who entered college in 1980 had graduated by 1987); and (d) athletic abuses.

Revised educational funding policies requiring cutbacks in both state and federal funding also have university officials concerned. Colleges and universities receive a large part of their revenue from state and federal sources; 40% from the state and 10% from the federal government. Institutions are realizing that raising tuition to compensate for funding cuts can, in the long run, be damaging. Overall economic conditions pose another concern for higher education officials. State and federal funding, tuition, endowment income, and gifts are all major sources of revenue for colleges and universities, and cannot be counted on during poor economic times.

Demographic trends, while dropping in rank from the previous year, are still a major concern for higher education officials. The Department of Education has predicted that the number of high school graduates will remain around 2.5 million through 1994 and then will rise slowly to 2.9 million by the year 2001, with increases taking place mostly in the West. On the average, enrollments are expected to remain stable over the next few years, however, population shifts may cause differing enrollment patterns and competition among regions.

Regardless of pronounced economic challenges, the notion that quality can be improved through more education is being entertained. Concerned by the debate over quality in higher education, some institutions are considering lengthening the academic year. A preliminary report by the Illinois Board of Education notes a relationship between increased instructional time and student achievement (Cage & Lederman, 1993)

Higher education has not only failed to adopt new techniques that have proven effective in improving quality and productivity in the industry, it has also lagged in educating its graduates

in those new techniques. Part of public criticism toward higher education has come from business and industry, claiming that graduates today are lacking in TQM skills required by industry (Coate, 1992; Jorgensen, 1992; Harris, 1993). IBM spends $1 billion annually to retrain workers in quality related issues and to train newly hired graduates how to work in cross functional teams. Similar complaints have been heard from Eastman Kodak and Xerox. Only between 1% and 5% of the business schools in the U.S. have adapted the curriculum to coincide with the quality revolution (Jorgensen, 1992). In the 1980's management education stressed that businesses should make products and services as quickly and cheaply as possible, practice hard selling campaigns, and control the workers. In the 1990's management education must emphasize the importance of making products better and encouraging the skills and participation of everyone in the organization (Feigenbaum, 1993).

Many business leaders see the university as an obstacle to the adoption of TQI principles as a business philosophy within the business sector. It is the university's responsibility to produce graduates that have been educated in quality issues, but they are slow to introduce programs into the curriculum. A former CEO of Motorola states that "manufacturers want graduate schools to start producing students who know something about total quality management. But, first faculty members need to get the message. The teaching of quality principles and practices represents a branch of knowledge that is missing from almost all of our new hires" (Fortune, 1992, p. 14). Similarly, the Chairman and CEO of Control Data Corporation calls for "the integration of TQM concepts across the entire curriculum of schools of business" (Price, 1991, p. 9)

Ettlie (1991) identifies three reasons why quality issues are not given attention in higher education.

1. Quality issues are considered to be the responsibility of the faculty who teach production and operations management. Other faculty don't feel that quality issues relate to their discipline, so they are not interested in it.
2. Quality is neither a discipline nor a major and is not given the same attention as majors such as marketing, management, finance, and accounting.
3. Quality issues are not in the research agenda of faculty. Generally, the products of faculty research will later end up in course content and curriculum.

Kaplan (1991) lists the reasons given by academics at the Summer 1990 Xerox Quality Forum why TQM has not been given much attention.

1. There is no hard evidence that TQM works.
2. There has been no clear message for faculty that TQM is a useful research area.
3. Academics generally resist change, therefore, it is hard to get them involved in new issues.
4. Most professors are functional specialists, not generalists.
5. The tenure and promotion process in higher education hinder TQM efforts because these systems promote individual efforts over team efforts.
6. TQM is not viewed as a research topic so the tenure system would hinder research in this area.
7. Academia needs detailed information on the experience with TQM in the business sector.

In an open letter published in the Harvard Business Review (1991), six U.S. companies (American Express, Ford Motor Company, IBM Corporation, Motorola, Proctor & Gamble, and Xerox) explain their opinion regarding TQM in the curriculum.

> We believe business and academia have a shared responsibility to learn to teach and to practice total quality management. If the United States expects to improve its global competitive performance, business and academia leaders must close ranks behind an agenda that stresses the importance and value of TQM. . . . The situation is bad for us all. Business bears the burden of educating and, in some cases, re-educating new hires. This not only represents an additional cost but also perpetuates competitive disadvantages. And academic institutions that are slow to embrace TQM at best miss the opportunity to lead change and at worst run the risk of becoming less relevant to the business world. (Harvard Business Review, 1991, pp. 94-95)

Lozier and Teeter (1993) discuss six foundations of TQM for colleges and universities. They include establishing a mission, creating a vision, continuously improving the process, using systematic analysis, promoting participation, and recognizing the university as a system. A mission statement identifies what the institution does and the purpose for being, as well as defines the individuals or groups who benefit from teaching, research and service of the institution. A vision statement describes where the institution will be in the future, when its mission and goals are reached.

Processes are the means by which the college or university moves toward accomplishing its mission, and process improvement involves eliminating mistakes in these processes. Three typical kinds of mistakes include rework (time spent correcting an earlier mistake), scrap (work that is thrown out and the whole process started over again), and unnecessary complexity (to many steps involved that add no value to the outcome). In higher education, examples of rework include (a) a student having to repeat a course, (b) an instructor having to repeat subject matter not properly covered in prerequisite courses, (c) the need to rewrite a check because it was originally written for the wrong amount, and (d) having to reprint a publication (schedule of classes, course catalogues, brochures etc.) because it contained incorrect information. Examples of scrap include (a) terminating faculty or aborting faculty searches and looking for new faculty, (b) students who flunk, and (c) plans that are abandoned. Unnecessary complexity in higher

education is characterized by (a) requiring too many signatures on forms for things such as purchases, changing majors, dropping a course, etc., (b) multiple application forms for admission, and (c) multiple steps to get a course approved.

Basing decisions on data, empowering employees, and encouraging teamwork also help build the foundations for TQM in higher education institutions. Changes and improvements should be based on fact and not on intuition, hunches, or feelings. In addition, individuals closest to the central workings of the process usually know the most about how to improve it, and they should feel empowered enough to speak out when they see a problem. "When 80 percent of the students cannot clearly see the experiment being demonstrated, it does not improve quality to tell students not to miss the laboratory class" (Lozier & Teeter, 1993, p. 10). Examples of team problem solving in higher education have occurred in areas such as physical plant renovations, hazardous waste disposal, acquiring sponsored research funding, faculty hiring, and classroom learning.

To properly implement the principles of TQM theory, administrators, faculty, and staff must take a systems view of the institution. "A learning organization constantly expands its capacity to create the future by recognizing that the success of any individual depends on the success of others" (Lozier & Teeter, 1993, p. 11). Systems thinking teaches that all departments, units, subdivisions, and individuals within an organization are interrelated and dependent on one another. Faculty who have heavy teaching loads are contributing to the success of those faculty members who make great discoveries through spending more time on research and less time teaching. Similarly, teaching quality in the classroom can effect institutional prestige which may effect fundraising, admission standards, and consequently, the quality of faculty hired (Miller, 1991).

With proper translation and adaptation, TQI principles can be applied to higher education institutions to help attract students, control costs, and answer accountability demands (Cornesky et al., 1992; Seymour & Chaffee, 1992; Melissaratos & Arendt, 1992). In the book *Using Deming to Improve Quality in Colleges and Universities* (Cornesky et al., 1992) the authors examine ways that each of Deming's 14 points might be applied to the university as an approach to increasing the quality of higher education.

1. *Constancy of Purpose.* Universities like all other organizations need to have plans for adapting to a changing environment. For the institution, constancy of purpose is having an institutional mission and a long range plan that incorporates research and innovation, and provides a vision of the university into the future. Many university mission statements are too broad and say little about the direction of the institution. It is essential that all members understand the institutional mission and that the institution make every effort to hire employees whose personal goals fit those of the university. An institution that is primarily a teaching facility hiring faculty who wish to spend much of their time pursuing research activities may see low morale, dissatisfaction and frustration among the faculty may result.

Long range planning helps to keep the university from reacting to daily concerns and haphazardly drifting away from its overall mission. The long range plan should be a detailed document that considers the impact of social, population, industrial, technological, and governmental trends on higher education. It should be developed to carry out the mission, and every department or unit at every level affected by the plan should be involved in the developing process. Involving people who will later be required to carry out the plan will make acceptance of the plan easier. To ensure that resources will be available to carry out the top priorities, budgets should be developed that allocate funds in a manner that will drive the plan. If planning

has been done appropriately, then the top priorities will be important factors that keep the university alive and moving into the future.

Innovation and institutional research are very important in carrying out a plan. Innovation is the key to progress, hence, it should be welcomed and encouraged at all levels of the university by all employees and adequate resources to fund innovative projects must be allocated. Institutional research should provide complete and accurate data, which should be available to everyone and be used to assess the impact of the plan on the consumers of the institution's products, education, research, and service. The impact on students and faculty should be considered first. If the university produces well educated graduates, quality research and delivers quality services then an increase in student enrollment and funding will follow. Consequently, the university's standing and the chances for its long term survival will improve.

2. *Adopt a new philosophy*. Higher education institutions must adopt a new philosophy about the definition of quality and how it can be improved. "Change is a potent factor in higher education. People fear it, resent it and ignore it, but it's inevitable" (p. 31) Change is constantly happening in the external environment and the institution must be willing to make concurring changes such as phasing out obsolete programs and developing new ones. The university cannot ignore the fact that graduates are leaving higher education without the skills to read, write, speak, think, and perform mathematical problems at the college level. If American industries are to achieve economic gain in the world market, then higher education institutions are responsible for providing the education that will put America in a competitive position in all industrial sectors and insure the welfare of the nation. American institutions of higher education must adopt a new definition of quality and ways to achieve that quality. One of the most important elements in any change process is attitude. Attitudes are often deeply ingrained and are very difficult to change.

Only with a change in deeply ingrained attitudes will a complete cultural change occur, so strict attention must be paid to initiate programs and agendas that will address and facilitate attitude change.

3. *Cease dependence on inspection.* The quality of graduates does not improve through testing. When placing students in the classroom, appropriate matching between students' learning styles and teachers' teaching styles must be considered. The typical format of lecture followed by a multiple choice exam is culturally biased and does not accommodate the needs of many students. By the year 2000, one third of college students will have a cultural background different from that of the typical white student of European descent. By not tending to the needs of this population, higher education will be placing one third of the college population at risk. Basing college admission criteria on SAT/ACT scores does nothing to ensure a quality education, and in fact, they tend to be culturally biased and can exclude certain societal groups.

The number of illiterate high school graduates is increasing and unless steps are taken to improve the total educational system, including K-12, colleges will continue to enroll students who are not prepared. In elementary and high schools, mentoring relationships with higher education students, alumni, retirees or staff could be implemented. In higher education, improvements in quality can be enhanced through improvements in advising, counseling, mentoring, and assessing students. Test should not be used at the end of the educational process to label students as pass or fail. To help improve quality, testing instruments administered randomly, by outside evaluators should be used to measure how well the system and teaching styles are working and how well what is learned relates to the long term plan of the institution.

4. *Long term relationships.* Broadly speaking, any university has two groups of suppliers. The first group consists of high schools and community colleges which supply the

students. Universities should work closely with high schools and community colleges to ensure that the incoming students have the skills necessary to succeed. Rather than increasing the remedial courses offered in universities, suppliers should be informed of the skills their students will need when they enter college. Subsequent development of community college and K-12 educational programs that will strengthen these skills will increase the quality of high school and community college graduates. The second group of suppliers are organizations and companies that provide services and equipment for the university (i.e. repair, janitorial, equipment, and bookstore). The university should develop long term relationships with those companies that are more reliable in providing better services and equipment in the long run. The practice of purchasing based on the lowest price results in additional expenses and frustration of students and employees and should be abandoned.

5. *Improve constantly*. Regular program reviews and the use of a departmental curriculum committee will help insure that the institution is continuously meeting societal needs. More cooperation should be encouraged among academic departments and between faculty and administrators in areas of general education and interdisciplinary programs so that quality educational services can be delivered. Improvement of the educational system is gradual, achieved by making incremental improvements in daily processes that will lead to each graduating class being a fraction more outstanding than the one before. However, in order for improvement to happen university wide, the talent and contributions of all employees must be appreciated.

6. *Institute on-the-job training*. Faculty, staff, and administrators should all be educated in the functions of other university offices and departments. In addition, it is important for everyone to know how actions in their office affect other offices and vice versa. Each employee

should also understand how his/her position is connected to the university mission and long range plan.

Often, the attitude in higher education institutions is that their responsibility is to train, not to be trained, and situations in which staff, faculty, and administrators may need to be retrained are overlooked. With the unprecedented, rapid increase in campus computerization, employees at all levels may need to be trained in hardware and software use. Furthermore, an issue only recently addressed on a few campuses is the pedagogical skills of faculty. Even though newly hired faculty are highly qualifled in their fields, it does not attest to their teaching ability, thus, training in teaching skills and instructional technology may be required. Additionally, staff training and seminars that provide skill required to perform in other positions of the institution should be offered and encouraged.

7. *Adopt and institute leadership.* "Many universities are over-administered and under-led" (p. 57). Administrators must be creative change agents and be able to spread the vision of the university. Three factors, care of customers, constant innovation, and committed people, affect the progress of the institution toward achieving its goals and objectives. The administrators ability to influence faculty and staff through vision, communication, trust, and confidence is central to maintaining the appropriate mix of these factors.

8. *Drive out fear.* It is not uncommon for faculty and administrators to mistrust each other. Even a tenured faculty member may still have fear of administrative revenge. People who have fear in the work place cannot concentrate on doing their best, and faculty who fear administrators cannot concentrate on improving quality and serving students. Open lines of communication for information distribution and problem solving must be accessible to all faculty and staff. Administrators should establish relationships of trust not just with words, but with

actions. Employees should not fear losing their employment because their talents and job requirements do not match. If an employee's talents are not suitable for one position, talents should be assessed and the individual placed in a suitable position. All personnel are important to the university and should feel so. Administrators' role expectations of faculty and staff should be based on both the personal needs of the individual and the needs of the institution.

9. *Break down barriers between departments.* Teamwork among administrators, faculty, and staff in serving the students is important. Cooperation among individuals within the same department, as well as cross functionally, should be evident. Recruiters, advisors, counselors, and professors should be involved with incoming students to assess the needs and problems that accompany them to the institution. In order to make a proper assessment and develop action, it is vital that cooperation among employees in these different functional areas exists. In addition, every department within the institution should know the functions of other departments. Academic departments need to look beyond responsibilities in their own pigeon holes, and evaluate the effect on the student of the sum of the efforts in all courses. Actions in one department influence actions in other departments and often times lack of communication among departments results in victimization of the student. Failure to communicate can result in wasted resources through duplication of effort, loss of students, low faculty morale, and overlooking activities important to student success because each department places the responsibility with another department.

10. *Eliminate slogans.* "Slogans do not result in quality performance, they generate frustration and resentment" (Deming, 1986, p. 78). Encouraging faculty to decrease the percentage of D's and F's in a course without supplying better prepared students or better instructional equipment is frustrating and insulting. This type of action is indicative of leaders

that lack leadership and do not appreciate the barriers to quality job performance. It is administration's responsibility to remove these barriers and provide adequate facilities and processes so faculty can perform.

11. *Eliminate quotas*. Work standards such as quotas and rates impede quality and guarantee inefficiency. Allocating resources to programs based solely on the cost per student credit hour is managing on figures alone, and figures can often reveal a distorted picture. This method of allocation is usually justified because, on the surface, it appears to increase productivity. However, other consequences that are not so evident also occur that are detrimental to quality including:

a. Fewer courses at upper division levels because enrollments are typically lower,
b. Less opportunity in some departments to receive a quality education due to lack of courses,
c. Graduates leaving college underprepared to get an appropriate job or attend graduate school,
d. Dissatisfied alumni and students that spread negative feelings to others about the institution, and
e. Lower student enrollment, leading to decreased need for faculty, leading to more dissatisfaction

Although the number of credit hours generated by a department is an important consideration, it should not be the only factor in resource allocation. Other factors like the quality of the program and the impact of the program on the mission of the institution should be considered in funding.

12. *Abolish annual ratings.* Often faculty or staff are evaluated on things over which they have no control, which can greatly affect their sense of pride in their work. Admissions and recruiting officers are often evaluated according to how many students are admitted to the university, creating an incentive to admit students who may not be qualified or to admit too many students for the facilities. Such conditions can result in large class sizes, insufficient amount of equipment, and equipment that is in poor working order due to overuse. Moreover, the percentage of students failing or dropping out will likely increase through no fault of the faculty. Although faculty may desire to exhibit teaching excellence they may not be able to due to conditions beyond their control.

Another common practice that decreases quality and pride in workmanship for faculty is evaluation based on the number of publications. Anxious to get research published, individuals may not take time to study the problem before doing the research. The quality of the research decreases because the focus is on meeting the quota of publications, thus, discoveries that may have been made are not due to fear of decreased productivity.

Cornesky et al suggest that a Professional Work Plan Agreement (PWPA) is a more appropriate way of evaluating faculty than the annual rating. A PWPA would indicate required courses to be taught, research activities, community services, and other activities required to improve the institution. In addition, personal goals of each faculty member would be contained in the PWPA along with how the institution plans to help him/her pursue those goals. Evaluations would focus on how the individual is developing professionally, both within the institution and personally, and how development might be enhanced. Evaluations, however, should not imply punishment or instill fear.

13. *Education and self improvement.* Employees educational and professional development are critical to improving the quality of education. Opportunities for personal and professional development should not only be supported by the administration, but should be encouraged. In order to deliver quality education, faculty not only must keep current in their field, but also must become skilled in technological methods of educational delivery as they are discovered. Continuing education for science faculty is essential. "One -half of scientific knowledge is obsolete or changed within two and one-half years" (Cornesky et al., 1992, p. 94). Weaknesses in development of all employees should be assessed, and seminars, courses, or workshops provided to help compensate.

14. *Involve everyone in the transformation.* The administration should seek the involvement of all faculty and staff in order to advance the prior thirteen points and to improve quality. Everyone, administration, faculty, and staff should procure a clear understanding of his/her role in quality improvement.

Olean (1991) identifies apparent parallels and conducive conditions between TQI and the higher education environment. Universities have products in the form of education, science, technology, and art, as well as services like community benefits, cultural offerings, and entertainment. Moreover, throughputs of the university are its buildings and other facilities through which education is delivered. University customers are many including students, alumni, business and industry, legislators, family of students, board members, and the community at large. Olean also designates several ways in which current university practices favor TQM and would facilitate implementation of the principles. Many institutions already involve employees in decision making or participative improvement efforts. Also, a number of them provide services

that are analogous to those in the private sector, such as libraries, hotels, restaurants, book stores, and health services.

Chaffee and Seymour (1991) identify changes that would occur in a university that adopts TQM. Procedures that are carried out merely because of organizational habit would be replaced with procedures that meet client needs, and the focus of policies and procedures would move toward customers/ clients (students, employers, parents, and other constituents). Individuals from different departments would work together on interdepartmental teams to solve problems. Outcomes assessment would also be influenced, with a decrease in the use of standardized and comprehensive tests for general knowledge. These tests would be replaced with smaller tests, administered more often throughout the semester with the goal of providing immediate feedback that the instructor would use to improve instruction and learning.

Many people in higher education fear assessment measures due to the fear of being held accountable (Seymour, 1993; Seymour & Chaffee, 1992). TQI can alleviate this fear, answer the call for accountability, and improve overall institutional effectiveness. Most current assessment efforts focus on student outcomes and provide little or no feedback about how learning takes place, why it didn't take place, whether it improved, or how it can improve. In addition, assessment often relies on quantitative "inspection at the end point" just to comply with legislative mandates so as not to jeopardize funding (Ewell, 1991). Therefore, administrators tend to become more concerned about quality outcomes than the faculty. Establishing assessment measures throughout the educational process in order to provide feedback for making corrections and changes to the program will not only satisfy the public cry for accountability, but will help the institution improve its processes, as well. Documenting patterns of student course taking,

student and instructor behavior, and connections across the curriculum, and then tying this to student outcomes, would provide information about potential cause and effect relationships.

Positive Experiences with TQI

College campuses first began experimenting with TQI in about 1986 (Chaffee, 1991-1992). Since then, many higher education institutions have initiated successful quality improvement efforts by starting small, with a process or two, and letting the positive results fuel more process efforts. TQI principles have been employed to improve learning in the classroom, increase and improve library services, increase speed of processing admissions applications, speed up maintenance work, decrease time and complexity of the registration process, and increase graduation rates (Coate, 1992; Thomason, 1993; Ord, 1993; Sokol, 1993; Seymour, 1993a; Nagy et al., 1993; Seymour & Chaffee, 1992; Harris, 1993).

Four early examples of higher education institutions that have initiated quality improvement programs are North Dakota University System, Oregon State University, Delaware County Community College and Fox Valley Technical College (Seymour, 1993; Coate, 1991; DeCosmo et al., 1991; Chaffee, 1991-1992; Tyler, 1993) North Dakota State University is the first higher education system to launch a TQI program (Seymour, 1993). During the 1980's the system's revenue dropped $40 million short of inflation while admitting an increasing number of students. In desperation, to offset the losses, tuition was tripled; class size was increased; equipment, student services and facilities were cut back; part time faculty was increased; and salaries were frozen. However, North Dakota soon realized that these were short term solutions that would soon lead to disaster, if continued. In search of a better way to manage their higher educational system, they turned to the principles of TQI in 1989. Their plan for quality improvement is set out in the "Partners for Progress Plan for 1990-1997". The plan identifies

specific quality improvement goals for 1997 for graduates, faculty, research, and public service personnel. Ellen Chaffee, vice president for Academic Affairs concluded, "TQM gave us a reason for hope when we hit bottom" (p. 36).

In the wake of an increasing number of unhappy constituencies, lack of resources, and low employee morale, Oregon State University initiated its first quality improvement program in 1989 (Coate, 1991). Some of the results so far include 23% reduction in the average duration of remodeling jobs, 94% decrease in the number of vouchers returned for correction, a 17% increase in the number of daily building security checks, increase in faculty and staff morale, and more satisfied students. The university's first year of experience with TQI revealed that: (1) a firm commitment from the president is essential, (2) a person of considerable authority must champion TQM from inception to implementation, (3) the essence of TQM is team study devoted to process improvement, and (4) the administrative services side is easier to start with than the academic side (Seymour, 1993).

In 1986 Delaware County Community College was one of the first higher education institutions to make a commitment to TQI (DeCosmos, 1991; Entner, 1993). According to DeCosmos (1991), the college chose TQI because they realized that the issues in the 1990's and into the next century are complex, unprecedented and require a new decision-making paradigm. Some of the future issues identified by the college include: the need for higher education institutions to conserve resources; the need for higher education to improve effectiveness and answer the public demands for accountability; the realization that student numbers are less and competition is increasing; and understanding that today's problems require the intelligence, hard work, and participation of everyone.

The college spent the first three years establishing goals, training people in TQI, and identifying core processes for improvement. Subsequently, 80% of the administrators and staff became actively involved in the effort. Some successful results of this practice have been the improvement of a phone registration system, development of a contracted TQI training program for businesses and other organizations, development and approval of a credit certificate program, and involvement of some faculty in TQI in the classroom. Faculty, however, are not forced to participate in the quality improvement program, but are included as they show interest (DeCosmo et al., 1991; Seymour, 1993). Commenting on the experience so far, Delaware County Community College's project coordinator declares:

> TQI requires cultural change and changes in management techniques. It is a change that is not undertaken lightly, nor is it one that takes place quickly. We are convinced, however, that TQI will be instrumental in ensuring that DCCC meets the challenges of the nineties and beyond. (Seymour, 1993, p. 37)

Another pioneer, Fox Valley Technical College, began its TQI program in 1986 and has experienced several positive outcomes. These include: reduced processing times for student applications thus reducing the risk of students going elsewhere; decreased employee accidents and workers compensation claims; revised performance appraisals to support quality improvement efforts; a more user friendly student services area; a two year degree program for quality improvement process specialist; and a guarantee to employers that all program graduates will have competence in TQI (Tyler, 1991).

Most of the efforts to incorporate TQI into higher education have concentrated on administrative areas and little attention has been paid to how TQI may be infused into classroom instruction (O'Neil et al., 1993; Hansen, 1993). Three examples of how TQI may be applied to instruction come from the Universities of Miami, Chicago, and Wisconsin-Madison. At the University of Miami, one professor begins his semester with a mission statement "to improve the

student's learning ability and to continuously improve the course" (O'Neil et al., 1993, p. 247). Throughout the semester, within guidelines provided by the instructor, the students participate in developing the course and curriculum. Feedback is provided to the instructor which he uses to revise and improve the course, not only for next semester's students, but for the current students.

At the University of Chicago, a TQI teaching lab is offered. Professors and instructors may use the lab to learn the application of TQI methods to teaching, curriculum development, and research. Students act as the consultants in the lab. Hansen (1993) describes a design at the University of Wisconsin-Madison used by an economics professor to apply TQI to his classroom. The design contains three elements that help the professor concentrate on customer focus, student involvement, and continuous improvement. To give heed to customer focus, proficiencies are emphasized in the course and are expected of all graduating economics majors. Student involvement is carried out by assigning team research projects and continuous improvement is carried out through ongoing student evaluations of the course and the instructor by a team of students.

Macchia (1993) describes how total quality management tools can be used in higher education institutions to assess educational processes in accordance with the cuatomers' needs. He provides examples including the use of a cause and effect diagram and a pareto chart in dealing with the cause of a poorly written essay by an English composition student. Control charts, histograms, and scattor plots are used to show frequency and distribution of students' scores.

In 1990, over 25 higher education institutions were identified as being involved in TQI (Teeter & Lozier, 1991). Results of a survey conducted by Quality Progress magazine in October 1991 reported 78 U.S. colleges and universities using TQI, fourteen of which are

community colleges (Coate, 1992). Higher education institutions identified include the University of Wisconsin at Madison, Maricopa Community College, University of Chicago, St. John Fisher University in Rochester and Samford University in Alabama (Coate, 1992; Nagy et al., 1993; Assar, 1993; Harris, 1993).

In a study conducted by Daniel Seymour and Casey Collett, 83 individuals from 22 colleges and universities implementing TQM responded to a survey. The results revealed that (Chaffee & Seymour, 1991):

1. TQM is implemented more often in the administrative areas than in academic areas.
2. TQM has been used in processes such as registration procedures, enrollment management, curriculum development, and outcomes assessment.
3. The most comprehensive TQM implementation is at community colleges and small private colleges.
4. Leadership from the top and in the units implementing TQM is crucial to its success.
5. Major benefits of TQM include creation of a common language across departments, increased efficiency, fewer errors, improved morale, greater interdepartmental cooperation, and financial savings.
6. Some obstacles to implementing TQM are resistance to change, considerable time needed to train staff and see results, and poor leadership.

Findings similar to numbers 1, 4, and 6 above were reported by Entin (1993) in a study of 10 Boston area colleges and universities.

Problems with TQI Implementation

Despite obvious parallels between TQI and current higher education practices, there are barriers that inhibit the adoption of TQI principles by the university culture (Coate, 1992; Entin,

1992; Liebmann, 1993; Olian, 1991; Yanckello & Flaherty, 1993; Winter, 1991; DeCosmo et al., 1991; Harris, 1993; O'Neil et al., 1993). In some cases the necessity to postpone or abandon TQI projects has ensued (Liebmann, 1993; Yanckello & Flaherty, 1993). Some of the barriers involve: customer identification and satisfaction, resistance from faculty, a tenure system that rewards individual performance over team performance and scholarship over teaching, reluctance to part with established routines, the rejection of total quality management because of its roots in business and industry, lack of perception that there is a crisis, university governance, hidden agendas, limited commitment, lack of proper training, political pressure, and allocation of resources to support improvements.

Universities have so many customers with diverse interests that deciding on which customer's needs will be met is difficult. Labeling students as customers is a controversial issue because many people within higher education find it difficult to conceptualize the student as a customer. The idea of asking students what they want and then designing the product to meet what is specified is troublesome. In the corporate world, the customer is generally not actively involved in producing the product, but in the educational process, the student is involved in producing an educated graduate. Students could also be perceived as raw inputs from a supplier (high schools and community colleges) to which value is added as they pass through the educational process.

Linden (1992-93) offers a model for meeting diverse customer needs in public organizations which may have difficulty in defining their customers, determining their needs, deciding between conflicting needs, and dealing with the connotation that "the customer is always right". Using what he calls the 3 Cs approach, customers should be divided into clients (those who pay), consumers (those who use the service or product), and constituents (those who are

neither of the former, but who have a vested interest in the organization's work) in order to simplify weighing and prioritizing conflicting demands. The next step in the process is to determine the customer's needs, not only from listening to stated needs, but by ascertaining unarticulated needs, as well. An important aspect to remember in assessing customer requests is that there may be underlying needs that the customer is not capable of directly stating. In addition, it may prove necessary to shape the customers' needs by pointing out available options, describing consequences, making recommendations, or by revealing the tradeoffs.

In deciding the nature of a request, the mission and priorities of the organization must be considered. If two of the groups identified using the 3 Cs approach have conflicting requests, the institution should first try to achieve consensus. If this is not successful, the organization can determine whose needs are more important to the institutional goals, with top priority given to clients and consumers. When a customer requests something that is inappropriate or contrary to public interest, information should be provided to the customer explaining the inappropriateness and suggesting alternatives that will provide more satisfying results. If the customer still insists on the requests after exhausting other options, an alternative, ethical way to satisfy the customer need must be sought. However, if the need simply cannot be met because it is unethical or contrary to the organization's mission, policies and mandates, the organization has no choice but to deny it.

A major barrier to implementing TQI in the university is faculty resistance (Coate, 1991, March 1992; Entin, 1993; Olian, 1991). Faculty generally have stronger identification with their field than with the institution in which they work. They often pursue goals that will advance them in their field, which may not necessarily be the same goals that will advance the institution toward its mission. In addition, the autonomous, anarchical nature of faculty management makes

it nearly impossible to pressure faculty to conform to TQI practices, therefore, administrative persuasion is the alternative. The majority of TQI efforts on the academic side are in the departments of business management and engineering. Entin (1993) suggests that "the reluctance of academic divisions to adopt TQI is alarming and may represent serious disjunction between market forces and the academic enterprise and indicate that faculty are not currently interested in satisfying their students and other customers" (p. 31)

According to Jorgensen (1992), academia tends to encourage individual performance and achievement rather than cross functional group performance. Individual faculty members are accustomed to working alone and are often competing for tenure or limited research grant money. Coate (1991) and O'Neil et al. (1993) contend that the perception of quality control is contrary to the beliefs and values that make up the academic culture. Such perception is common, because quality control has the connotation of working against diversity and creating graduates that come off of an educational assembly line all the same. There is concern in academe that faculty's control over instructional delivery may be eliminated and that uniformity will replace diversity in instructional methods.

Seymour (1993b) contends that compartmentalization is a hindrance to taking a process prospective. The higher education process has been chopped into many separate pieces - admissions, advising, student affairs, academics, placement, etc., - each unaware of how the actions of one may affect the other, which ultimately affects the quality of the final product.

> We are so isolated from what is upstream and downstream that we never get to see the broader picture. The result is that we spend our time defending the status quo of our own little compartment - be it a department, a center, or an office. Without the sense of connectedness that comes from understanding the role of other members of a process, we seldom stop to dwell on the consequences of our actions. (Seymour, 1993b, p. 79,80)

An additional common obstacle to TQI implementation is the attitude that TQI is only a fad (Coate, 1992). Many people are reluctant to try TQI because they believe that it is simply the latest thing in management philosophies that will soon pass. Nevertheless, TQI philosophy is based on behavioral science and has grown out of other management theories. Several passing managerial practices took the form of a set of confining steps or "the one best way to do things" to which the organization was expected to strictly adhere. In contrast, TQM outlines basic principles and tools for good management, from which practical applications are developed and tailored to meet specific organizational needs. This flexible structure is what makes it adaptable to all types of organizations (Chaffee, 1991-1992).

Coate (1991) points out some common attitudes within the higher education environment that can obstruct the implementation of a quality improvement program: (1) wanting an immediate solution to problems instead of taking a long term approach; (2) the perception of some individuals that problems do exist, but not in my department; (3) suspicion of TQI because it is not based on scholarly investigation; and (4) the unwillingness and resistance to change.

Conclusion

Higher education institutions cannot continue to isolate themselves from the socio-economic environment. Raising taxes and tuition to secure funding are no longer effective options. Scarce resources, uncertainty in demographics, and public concerns about the quality of education have created an urgency to find more efficient means of administering higher education. In order to remain viable, higher education institutions must offer the highest quality service possible and this means satisfying the needs of the students, business/industry, alumni, funding agencies, local community and other constituencies that can help them maintain long

term existence. Moreover, higher education institutions will have to learn how to do more with less, just as industry has had to do. Daniel Seymour (1993b) elaborates:

> Manufacturers and non-profit companies are no longer separate entities. Everyone, including colleges and universities, is in the same business - the service business. Everyone needs to have an expanded notion of quality that goes beyond fulfilling the technical requirements of the customer. Competition, costs, accountability, and a service orientation are the driving forces - the motivation - behind the incline of quality. . . . The motivation is now clear. Either respond to the call for quality or step aside because others will be more than happy to move to the front of the line. (Seymour, 1993b, p. 8)

The introductory statement of the *Special Advisory for College and University Presidents* issued in 1988 by the Council for Advancement and Support of Education begins:

> We write the nation's 3400 college and university presidents to ask for your help in addressing two urgent tasks - improving higher education's performance in areas of abiding concern to the American public and communicating to the public that improvements are, in fact, being made. Presidents know only too well that criticism of higher education is becoming more strident and more widespread. Some of it has been fueled by specific people or incidents. Much of it, however, is deep-seated: a growing public perception that higher education is faltering in the delivery of its services to our citizens and its promise for the nation's betterment. (Seymour, 1993, p. 169)

Uncertainty regarding funding, demographic shifts, and accountability concerns is causing many institutions to reexamine their mission. This will involve making changes in the core processes, the curriculum, programs, and courses. Considering customer needs (students, parents, funding agencies, etc.) is essential in deciding on what changes should be made. The student population is changing to include more part-time students, older students, and more educationally disadvantaged students (Miller, 1991). Colleges and universities that don't consider how the needs of new student groups differ from past student populations may experience decreasing enrollment leading to decreases in funding, and, consequently, decreasing institutional prestige which could continue on a downward spiral.

Quality in higher education institutions has traditionally been measured in terms of inputs into the system - the number of faculty, number of library books, student teacher ratio, number of Ph.D.'s, research records, grant dollars, etc. (Seymour, 1993b). The main method of quality measurement has been the accreditation review. If appropriate accreditation reports are completed, submitted, and passed once every five or ten years, then the institution is said to provide quality education and services. However, an institution's state of the art equipment and competent faculty is not a guarantee that the educational delivery process is also state of the art.

The systems view, encouraged by TQI, will allow colleges and universities to work more closely with high schools and community colleges (suppliers of students) so students are more prepared when they enter higher education. Too much time and too many resources are spent teaching what students should have already learned, and in a time of scarce resources, these funds could be directed to other promising programs instead of being spent on reteaching (rework) students. Close relationships with high schools and community colleges, the suppliers, will not only ensure educationally prepared students for the university, but also will increase the likelihood of the university being recommended by the supplier to the students. Public perception that higher education institutions are important in shaping overall society, obliges these institutions to be concerned about the whole educational system.

In summary, the review of literature indicates that the future of higher education institutions is in jeopardy. Concerns over the quality of higher education coupled with a decreasing pool of resources and a shifting population have created uncertainty over the traditional philosophies underlying higher education administration. Much of the literature has identified how TQI, as an alternative method of administering higher education, could help improve the perception of the quality of higher education, make more efficient use of resources,

and attract competent students and faculty. TQI has been successfully implemented in various types of organizations, including higher education institutions, and additional research into its use within the educational sector is warranted. Moreover, faculty, being central to the academic operations of the institution, are one of the most influential campus groups in successful implementation of any change process. As pointed out in the literature, perceptions or poor attitude about the TQI philosophy, and change in general, have lead to problems in implementing quality improvement programs in some institutions. This research, therefore, takes one step forward toward discovering new practices to improve the educational system, by studying some of the many important academic attitudes. The purpose of this study is to assess attitudes of faculty and DEOs, at Iowa State University, toward issues identified in Deming's 14 principles of quality improvement, as they relate to the university setting. Specifically, the major problem is to study the perceptions of the faculty and DEOs of the involvement, methods, techniques, commitment, innovation, education, and cultural transformation required for the successful implementation of TQI.

CHAPTER III METHODOLOGY

This chapter describes the methods and procedures employed in conducting the study. It has been divided into six sections:

- Development of the data collection instrument
- Population and sample
- Pilot testing
- Data collection
- Research questions and hypotheses
- Research design

Development of the Data Collection Instrument

The use of a Likert-type questionnaire, developed by the researcher, is considered to be the most appropriate method of collecting data for this research. The *Total Quality Improvement Attitude Scale (TQIAS)* was developed, guided by review of related literature, for the purpose of measuring attitudes and collecting demographic data of faculty and DEOs.

Attitudes are not overt responses, but predispose individuals to respond overtly, therefore, they must be measured indirectly (Shaw & Wright, 1967; Best, 1977; Borg & Gall, 1983). By eliciting answers to questions or reactions to statements, a sample of an individual's opinion is obtained. From this opinion, a person's attitude may be inferred. One of the most important reasons for measuring attitudes in educational research is their possible predictive value. In one study concerned with the predictive value of attitude scales, Charles Tittle and

Richard Hill compared the effectiveness of various types of attitude scales (Likert, Guttman, Semantic Differential, Thurstone, Self-Rating) in predicting objective indices of voting behavior. The predictive value of the Likert scale was shown to be superior to all other types of scales (Borg & Gall, 1983).

According to Best (1977) several methods have been employed to assess the attitudes of individuals:

1. Asking the respondent how he/she directly feels about a subject using an open or closed format.
2. Asking the respondent to check from a list of items, those with which she/he is in agreement.
3. Asking the respondent to indicate his/her degree of disagreement or agreement with a series of statements.
4. Inferring the attitude of respondents from her/his reaction to a projective device (a projective device collects data without letting the respondent know how he/she should respond to appear in the best light, allowing the attitude to be revealed unconsciously).

However, individuals often may not be able to express their attitude directly for several reasons. A person may hide his/her real attitude because it is considered to be socially unacceptable or against certain norms. Also, an individual may not know his/her attitude toward a phenomenon if he/she has never experienced it nor considered it before. Thus, methods 3 and 4 of measuring attitude are more commonly used than methods 1 and 2, particularly with research that deals with controversial subject matter.

Likert-type scale construction consists of collecting a number of statements about the research subject that express opinions held by a number of people. Useful methods of collecting statements include selecting relevant statements from other tests or collecting them from related literature. It should be clear whether the statement is expressing definite favorableness or unfavorableness toward the subject, and the number of statements expressing each of these views should be approximately equal. After the statements have been collected and written into a questionnaire form, a pilot test is administered and items that do not correlate with the total test should be discarded. The most common Likert-type scaling technique assigns values to the responses on a five point scale with five indicating the most favorable response and one indicating the least favorable response (Shaw & Wright, 1967; Kellenberger, 1992; Aiken, 1976; Best, 1977).

In accordance with the related research, most of the items on the TQIAS were taken from discussions of Deming's 14 principles, by several authors, detailed in chapter 2. Literature relating the principles of quality improvement to the higher education setting were especially useful and extensively used in collecting questionnaire items to measure attitude. In addition, review of the *Productivity Climate Inventory*, an instrument to measure adherence to Deming's 14 principles, developed by McCullough (1988) was of some value in developing items.

As discussed previously in the review of literature, Deming's theory is summarized in 14 points. These points, however, are neither abstracts nor are they exclusive from each other. Each point includes several ideas. A questionnaire that would include all the aspects raised in each of the 14 points would be very lengthy and exceed the limitations of this study. Thus it was decided to develop a questionnaire that would include only those aspects that were more frequently raised in the literature as they relate to the application of TQI to higher education.

The final questionnaire, the TQIAS, contains 8 demographic items (items 1-8) and 60 attitude items (items 9A-55) intended to measure the attitude of the respondents toward each of the aspects. There was no more than one item for each of the aspects. Table 3.1 shows the distribution of the items within each of the 14 points. These items, however, are not inclusive of all the aspects that can be raised within each of the 14 points. Questions 10 through 55 are answered on a 5 point Likert-type scale ranging from strongly disagree to strongly with a response of 1=strongly disagree and 5=strongly agree. Items 9A through 9I are answered on a scale that ranges from not important to extremely important with 1=not important and 5=extremely important. The demographic questions ask respondents to answer questions regarding their academic rank, tenure, age, gender, college, length of time as a faculty member, whether or not they have an administrative appointment, and the percentage of time spent on teaching, research, administration, and service.

Table 3.1. Distribution of Items Within Each of Deming's 14 Points

Point	Items	Point	Items
1	9A-9I, 10, 11, 12, 13	8	32A, 32B, 32C, 33A, 33B, 33C
2	14, 15, 16	9	34, 35, 36, 37
3	17, 18, 19, 20	10	38, 39, 40, 41
4	21, 22, 23	11	24, 25, 42, 43, 44
5	26	12	45, 46, 47
6	27, 28, 29, 30, 31	13	51, 52A, 52B, 54
7	48, 49, 50	14	53, 55

Population and Sample

This study had two populations. The first consisted of 1308 faculty members employed at Iowa State University during spring semester 1994, excluding DEOs and temporary, visiting, adjunct, and affiliate faculty. The second population consisted of 59 DEOs employed at Iowa State University during the same semester. This population also excluded temporary, visiting, adjunct, and affiliate faculty. These populations were identified from lists obtained from the Affirmative Action Office at Iowa State University (Figure 3.1).

A sample size of at least 400, roughly one-third of the population, was desired because it would provide a large enough sample to be reliable and still be within the time and financial constraints of the researcher. To ensure representativeness of this sample, the faculty population was stratified by (1) college, (2) gender within college, and (3) academic rank within gender. However, because of the size of the faculty population, stratification beyond gender was not possible and thus, no stratification was done on age, tenure, and length of time as a faculty member. The stratification was performed using Microsoft Excel computer program. Once a stratified list of the population was developed, the sample was drawn by beginning at a random starting point, and selecting every third name on the entire list. The selection process was accomplished using Iowa State University's main frame computer and a Pascal program that generated the list. This ensured that overall, one-third of the population (436 out of 1308) was included in the sample. Since the population of DEOs was small, 59 members, the total population was chosen as the second sample of this study.

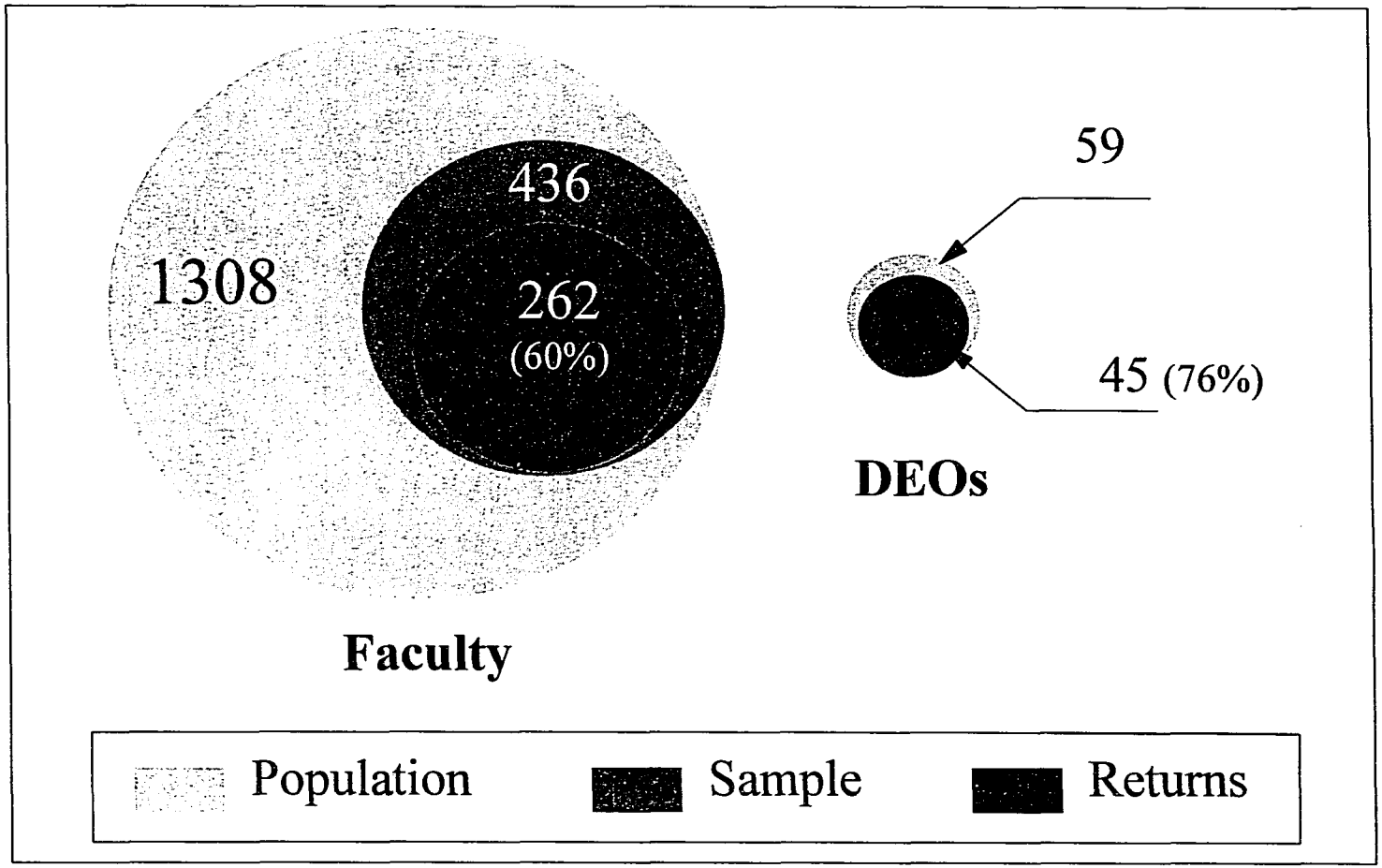


Figure 3.1. Populations, Samples, and Questionnaire Return Rate for Faculty and Department Executive Officers.

Pilot Study

The TQIAS was administered to a sample of 10 individuals, consisting of faculty and one individual who had previously served in the capacity of a department executive officer. None of the individuals in the pilot study were among those already chosen to be in the sample. The respondents were asked to comment on the appearance, including length, of the questionnaire, and to identify any items that seem vague, ambiguous, misleading, or otherwise unclear.

Many valuable comments were received regarding various items and the questionnaire was modified accordingly. The most valuable outcome of the pilot study was the negativity toward the questionnaire once the participant discovered it was about TQM (which at the time of the pilot study was obvious from the title). Two participants only half completed it, stating that TQM was not their field and it did not apply to them. Ettlie (1991) states that one of the reasons quality issues are not given attention in higher education is because faculty don't feel that quality issues relate to their disciplines, so they are not interested in it. Several other participants lashed out at the researcher, before they even completed reading the first page, making verbal comments about how TQM was being forced upon them and inferring that this research was somehow promoting that situation. Sullivan and Siggins (1993), Seymour (1993c), and Geddes (1993) cite faculty's repugnance of TQI terminology as a fundamental problem facing higher education institutions with a TQI initiative.

> Another fundamental problem facing institutions of higher education is the need to overcome resistance among faculty to the concepts of TQM. Faculty resist the marketplace vocabulary such as "customers" and "suppliers" used in TQM, claiming that it suggests that professors "sell" their knowledge to students for the "price" of tuition. (Sullivan & Siggins, 1993, p. 167)
>
> The first barrier, met early in the programme but continuing into the Total Quality Initiative, was one of language, reflecting distrust of the business ethos from which TQM emanated. . . . We did not, therefore, underestimate the

> difficulty of gaining acceptance for TQM, the importance of gaining staff confidence and the potential for total failure if they became alienated. It was accepted that the careful use of language was important in this respect. (Geddes,1993, p. 357)

Additional comments included the appropriateness of using the term "customer" to refer to constituencies of the university. Following is an outline of the remaining comments.

- Add "administration" to the choices in question 8
- The answering method in question 9 was confusing because the question asks which **are** customers, but there is no space to check which are customers, only to check which **are not** customers (80% pilot study participants had a similar comment).
- Some faculty members may not be tenure track, so "not in tenure track" should be added to the answer choices in question 2.
- Age categories should be provided instead of directly asking people to write down their age.
- Several items were really asking two or three questions in one, but only providing the respondent one response to check.
- A few other items could be more clearly worded by removing unnecessary words and shortening the length of the question.

Considering these comments, questions 8, 2, & 4 were modified accordingly. The answer choice of "not a customer" on question 9, which was part of the previous version of the questionnaire, was removed and the question was reworded. Items that asked multiple questions in one were separated into multiple questions in order to allow the respondent to answer each question individually. Items that were indicated as unclear were worded more clearly. In view of the bias with which the questionnaire was received, the researcher decided to remove all direct

references to TQM or customers from the questionnaire. The questions were modified so as not to use traditional TQM or business-like terminology and the title was changed to "Leadership Attribute Scale" so respondents could focus on only the questions asked, reducing unrelated bias thinking.

Data Collection, Coding and Entry

Upon approval from the human subjects committee, one questionnaire, a cover letter, and a pre-addressed return envelope were sent to each subject through the Iowa State University campus mail system. The return envelopes were pre-stamped with the words "campus mail". The following measures were employed to obtain a better rate of return and to ensure proper and timely delivery of the questionnaires.

1. None of the questionnaires were pre-coded for identification purposes in order to ensure complete anonymity.
2. The follow-up letter was mailed to everyone in the sample and included a thank you note for those who had responded.
3. All respondents were invited to request a summary of the results, if desired.
4. The questionnaire was formatted so that it was both user friendly and attractive. The cover letter and the follow-up letter were neatly and attractively designed, as well.
5. The mailing and return envelopes were individually laser printed and the spelling of the names were double checked.
6. The Office of Provost was contacted and informed of the researcher's intention of sending a large quantity of mail through the campus mail system.

7. Information was obtained from the campus mail system regarding ways to facilitate the delivery of the questionnaires. Based on the suggestions received, the envelopes were pre-sorted and bundled according to the building and the point of delivery within the building.

Participants were instructed to return the completed instrument via the campus mail in the pre-addressed return envelope, pre-stamped with the words "campus mail". The follow-up letters and thank you notes were sent to all participants two weeks after the first mailing.

From the faculty sample, 265 out 436 questionnaires were returned yielding a return rate of 61%. Three of the questionnaires were incomplete and thus, the final faculty sample included 262 subjects. Forty-five out of 59 DEOs (76%) responded to the questionnaire. Table 3.2 provides details of the questionnaire return rate starting with the day after the questionnaires were mailed.

Each returned questionnaire was given an identification number which included a number for the sample, one for the day of the return, and a chronological number to be used to identify the questionnaire. Except for those subjects who voluntarily included their name and address in the return envelope in order to receive a summary of the results, it was not possible to identify any questionnaire with the respondent. The identification number was only used for the purpose of data entry and possible corrections. In addition, the demographic and TQI attitude items were numerically coded. Coding used for the TQI attitude items was as follows:

> For items 9A to 9B which inquired about the importance of meeting the needs of university constituents: 1=Not important; 2=Somewhat important; 3=Important; 4=Very important; 5=Extremely important
>
> For items 10 through 55: 1=Strongly disagree; 2=Disagree; 3=Neither agree nor disagree; 4=Agree; 5=Strongly agree

Table 3.2. Daily Details of Questionnaire Return Rate (Weekends Are Excluded)

Day(s) after mailing	Faculty sample	DEOs sample	Total	Percent return
1	79	14	93	30.3
2	50	8	58	18.9
3	46	5	51	16.6
4	22	7	29	9.4
5	7	1	8	2.6
6	8	1	9	2.9
7	4	0	4	1.3
8	9	2	11	3.6
9	7	2	9	2.9
10	5	0	5	1.6
11*	2	1	3	1.0
12	4	0	4	1.3
13	7	1	8	2.6
14	1	0	1	0.3
15	3	0	3	1.0
16-30	8	3	11	3.6
Total	262	45	307	100

*Follow-up letters were mailed.

Data from all returned questionnaires were entered using a computer text editor. Once all the data were entered, the entry process was repeated and all data were entered for a second time resulting in two separate data files. The two separate data files were then uploaded to Iowa State University's main frame computer and were compared to each other using the "compare" command on Wylbur. This command compared the two data files line-by-line, and reported inconsistencies between the lines. Any discrepancies between the two files were noted and once corrected, the process was repeated until no differences were found. This process ensured a very high margin of accuracy in data entry.

Research Questions and Hypotheses

The review of related literature suggests that individuals within the academic side of the institution hold less favorable attitudes about the TQI principles than those in administrative areas. While faculty was addressed as a whole, faculty subgroups were not a major part of the literature. Moreover, the researcher did not find any literature that was based on empirical data collected across all the colleges and departments of a major institution of higher education regarding the attitude of faculty toward the aspects of TQI theory. Therefore, the research questions of this study, as stated below, are justified by the lack of data and literature regarding the attitudes of faculty across all colleges and departments of a major institution of higher education.

1. Do DEOs have significantly different attitudes toward Deming's 14 principles than faculty?
2. Are there significant differences in the attitudes of faculty at Iowa State University toward Deming's 14 principles when the effects of the variables of academic rank, gender, college, age, tenure, and length of time as a faculty member are considered?

The following null hypotheses have been developed for testing in an attempt to provide answers to the above questions.

Null Hypothesis I

There are no significant differences in the mean responses between DEOs and faculty on items 9 through 55 of the TQIAS.

Null Hypothesis II

There are no significant differences in the mean responses among faculty in different academic ranks on items 9 through 55 of the TQIAS.

Null Hypothesis III

There are no significant differences in the mean responses between male and female faculty on items 9 through 55 of the TQIAS.

Null Hypothesis IV

There are no significant differences in the mean responses among faculty employed in different colleges on items 9 through 55 of the TQIAS.

Null Hypothesis V

There are no significant differences in the mean responses among faculty in different age ranges on items 9 through 55 of the TQIAS.

Null Hypothesis VI

There are no significant differences in the mean responses between tenured and non-tenured faculty on items 9 through 55 of the TQIAS.

Null Hypothesis VII

There are no significant differences in the mean responses among faculty according to their years as a faculty member in a higher education institution on items 9 through 55 of the TQIAS.

Research Design

Two independent samples were drawn for this study, faculty and DEOs. As a whole, the two samples were compared. For the remainder of the study, the faculty respondents were divided into subgroups with regard to their academic rank, gender, college, age, tenure, and length of time as a faculty member in a higher education institution. The data were examined in accordance with the hypotheses of the study and comparison was done on an item by item basis. To test null hypotheses I, III, and VI, group mean scores were determined for each item on the questionnaire and statistical t-tests were used to test the null hypotheses.

One way analysis of variance (ANOVA) was used to test the remaining null hypotheses. Comparisons were made on an item by item basis. Group means were determined for each item and compared within each group using ANOVA. Further testing was done using Scheffe and Student-Newman-Keuls tests of multiple comparisons to identify the statistically different groups. To test for internal reliability and consistency, the Pearson product moment correlations of the items were computed and the reliability of the test was examined using Cronbach's alpha.

CHAPTER IV RESULTS AND ANALYSIS

Chapter four is designed to analyze the data collected from the questionnaire utilized in the study. The chapter contains three parts - Descriptive Data, Comparison of Samples and Faculty Subgroups, and Summary. Part I contains descriptive information about the characteristics of the subjects in the study and the results of the reliability test of the TQIAS. Part II contains two subsections: The Item by Item Analysis and The Factor Analysis. The Item by Item Analysis gives the results of the tests of the seven null hypotheses on an item by item basis. The section entitled The Factor Analysis examines the results and reliability tests of the factor analysis. Although the "interaction effects" may influence the results, for the purpose of this study, only the "main effects" are examined. Finally Part III provides a summary of the chapter.

The instrument developed by the researcher was not inclusive of all the aspects of the TQI principles. As stated in chapter 3, a questionnaire that would address all the issues of Deming's theory, would have been very lengthy and beyond the scope of this study. Thus, the intention was to cover some of the issues in each point that were more frequently raised in the literature. The review of literature reveals that many of these issues, e.g. testing, performance reviews, and overcrowded classes are not only a part of Deming's principles but are also of interest to the academic community. In addition, even though positive attitudes toward these aspects collectively means a more positive attitude toward TQI principles, the instrument is not inclusive of all the aspects and has not previously been tested, and an attitude score drawn only from these items may not possess high reliability. Thus, it was decided to (1) report the item by item analysis of the data as they were presented in the questionnaire, *without recoding the*

negative items, (2) recode the negative items and do exploratory factor analysis, and (3) make comparisons across faculty subgroups on the factors.

Descriptive Data

Two hundred and sixty-two faculty members and 45 DEOs with appointments at Iowa State University in the Spring semester 1994 participated in the study. Both samples received identical questionnaires. The two samples were later identified by the responses on the question asking whether or not they had an administrative appointment. Only those who had indicated an administrative appointment as a chair or head were placed in the sample of DEOs. From the sample of the faculty, one of the respondents had identified himself as an instructor. Since the sample of this study was to include only the full, associate, and assistant faculty, the questionnaire from this respondent was not included in the data analysis and his demographics are not reported in the descriptive data. As a result, the final sample of the faculty included responses from 261 individuals. Certain characteristics of the participants were extracted from the data and are presented in this section.

Age and Gender

Faculty sample. Two hundred and six (78.9%) males and 55 (22.1%) females were represented in the collected data (Figure 4.1a). Of the 262 respondents, 8 (3.1%) subjects were 30 years old or less, 13 (5.0%) subjects were 31 to 35 years old, 36 (13.8%) were 36 to 40 years old, 40 (15.3%) were 41-45, 43 (16.5%) were 46-50, 36 (13.8%) were 51-55 years old, and 85 (32.6%) subjects were 56 years old or older (Figure 4.2a and Table 4.1).

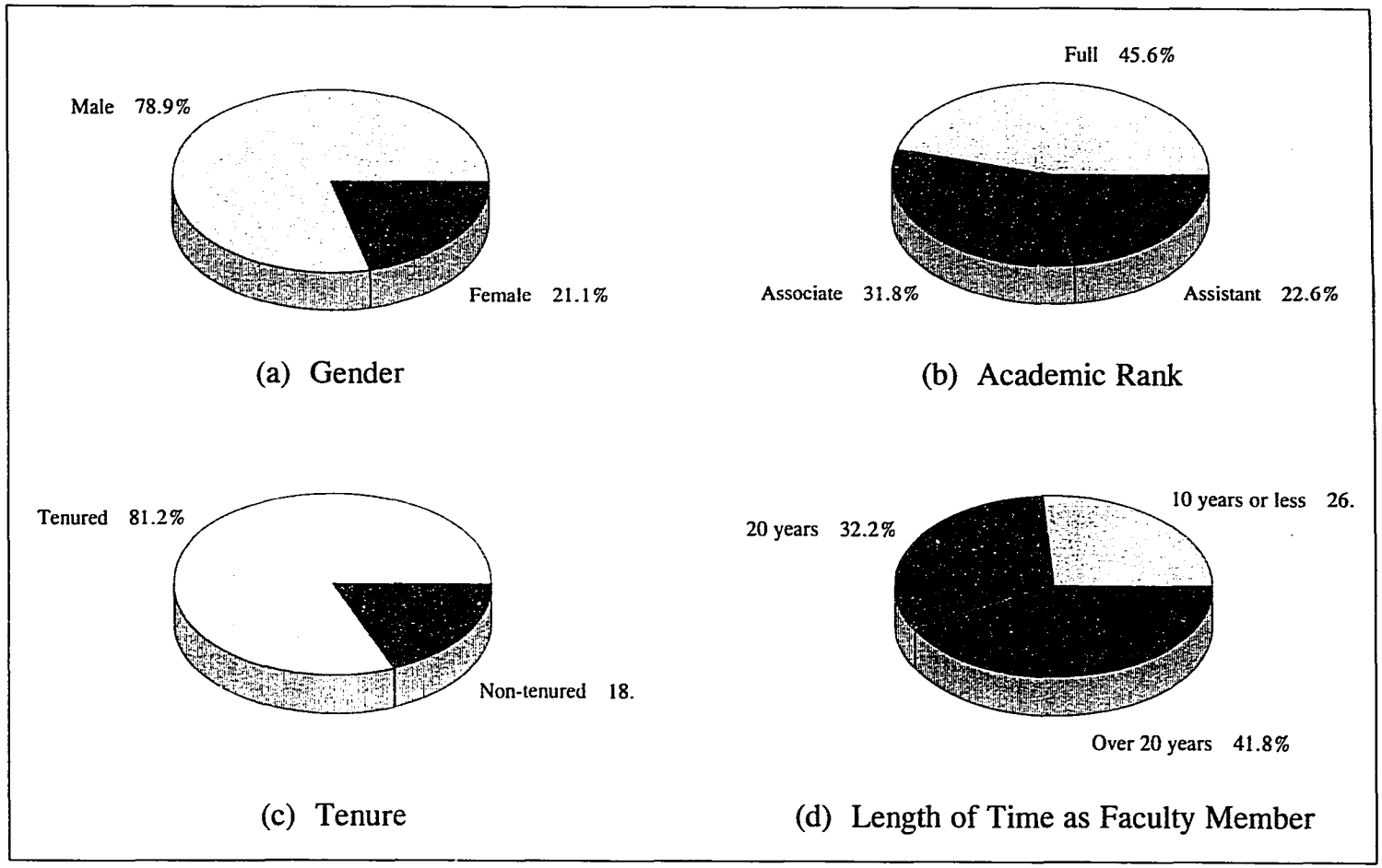


Figure 4.1. Distribution of the Faculty Respondents by (a) Gender, (b) Academic rank, (c) Tenure, and (d) Length of Time as a Faculty Member in an Institution of Higher Education (N=261).

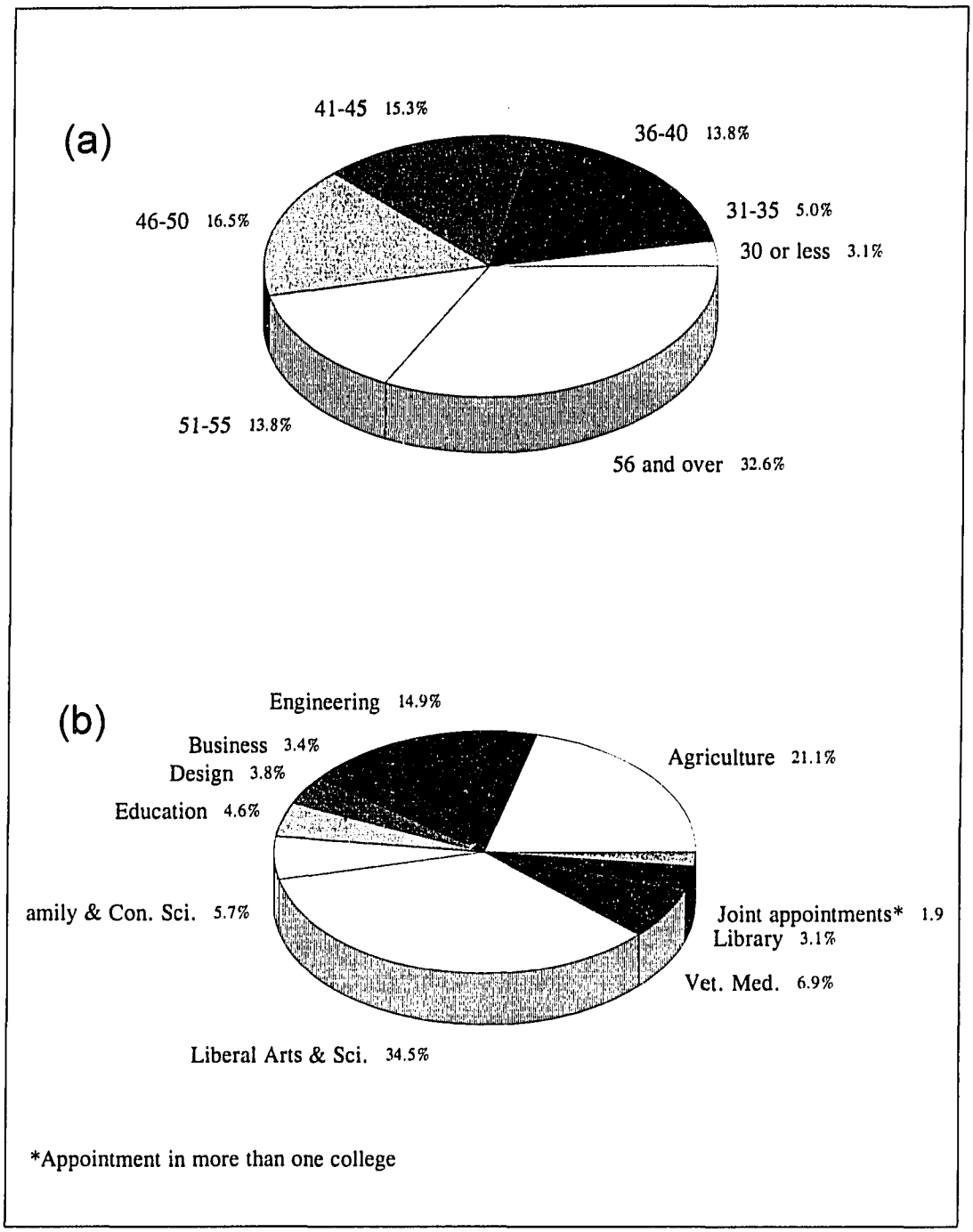


Figure 4.2. Distribution of the Faculty Respondents by (a) Age Groups and (b) College of Appointment (N=261).

DEO sample. Thirty-three (73.3%) males and 12 (26.7%) females were represented in the collected data (Table 4.2 and Figure 4.3a). Of the 45 respondents, 1 (2.2%) subjects were 31 to 35 years old, 2 (4.4%) were 36 to 40 years old, 6 (13.3%) were 41-45, 12 (26.7%) were 46-50, 11 (24.4%) were 51-55 years old, and 13 (28.9%) subjects were 56 years old or older. No one in this sample was in the age range of 30 years or younger (Figure 4.4a).

Table 4.1. Faculty Grouped by Age and Gender

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
30 or less	2	3.6	6	2.9	8	3.1
31 - 35	4	7.3	9	4.4	13	5.0
36 - 40	6	10.9	30	14.6	36	13.8
41 - 45	11	20.0	29	14.1	40	15.3
46 - 50	14	25.5	29	14.1	43	16.5
51 - 55	8	14.5	28	13.6	36	13.8
56 and over	10	18.2	75	36.4	85	32.6
Total	55	100	206	100	261	100

Table 4.2. DEOs Grouped by Age and Gender

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
30 or less	0	0.0	0	0.0	0	0.0
31 - 35	0	0.0	1	3.0	1	2.2
36 - 40	1	8.3	1	3.0	2	4.4
41 - 45	1	8.3	5	15.5	6	13.3
46 - 50	3	25.0	9	27.3	12	26.7
51 - 55	3	25.0	8	24.2	11	24.4
56 and over	4	33.3	9	27.3	13	28.9
Total	12	100	33	100	45	100

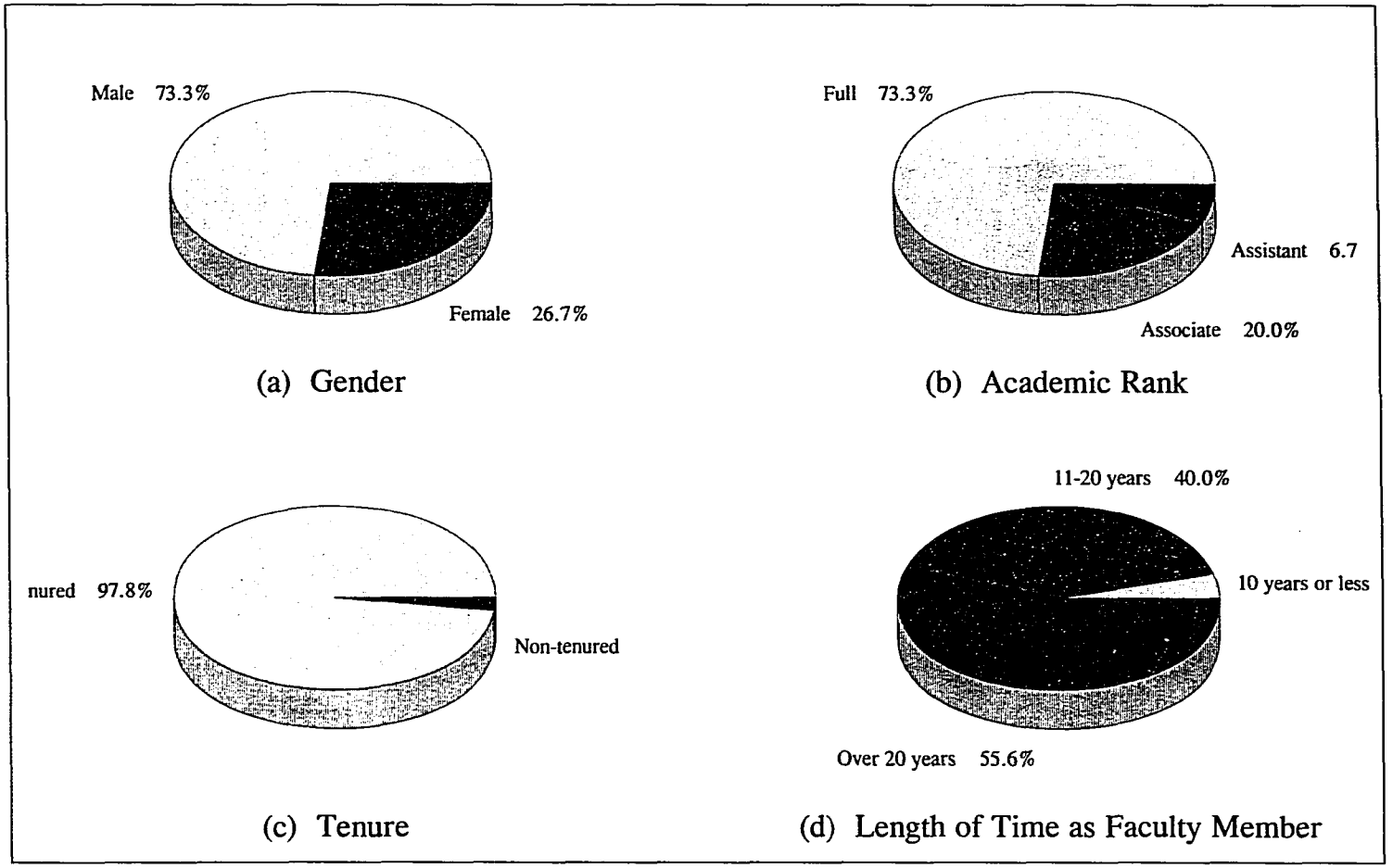


Figure 4.3. Distribution of the DEO Respondents by (a) Gender, (b) Academic rank, (c) Tenure, and (d) Length of Time as a Faculty Member in an Institution of Higher Education (N=45).

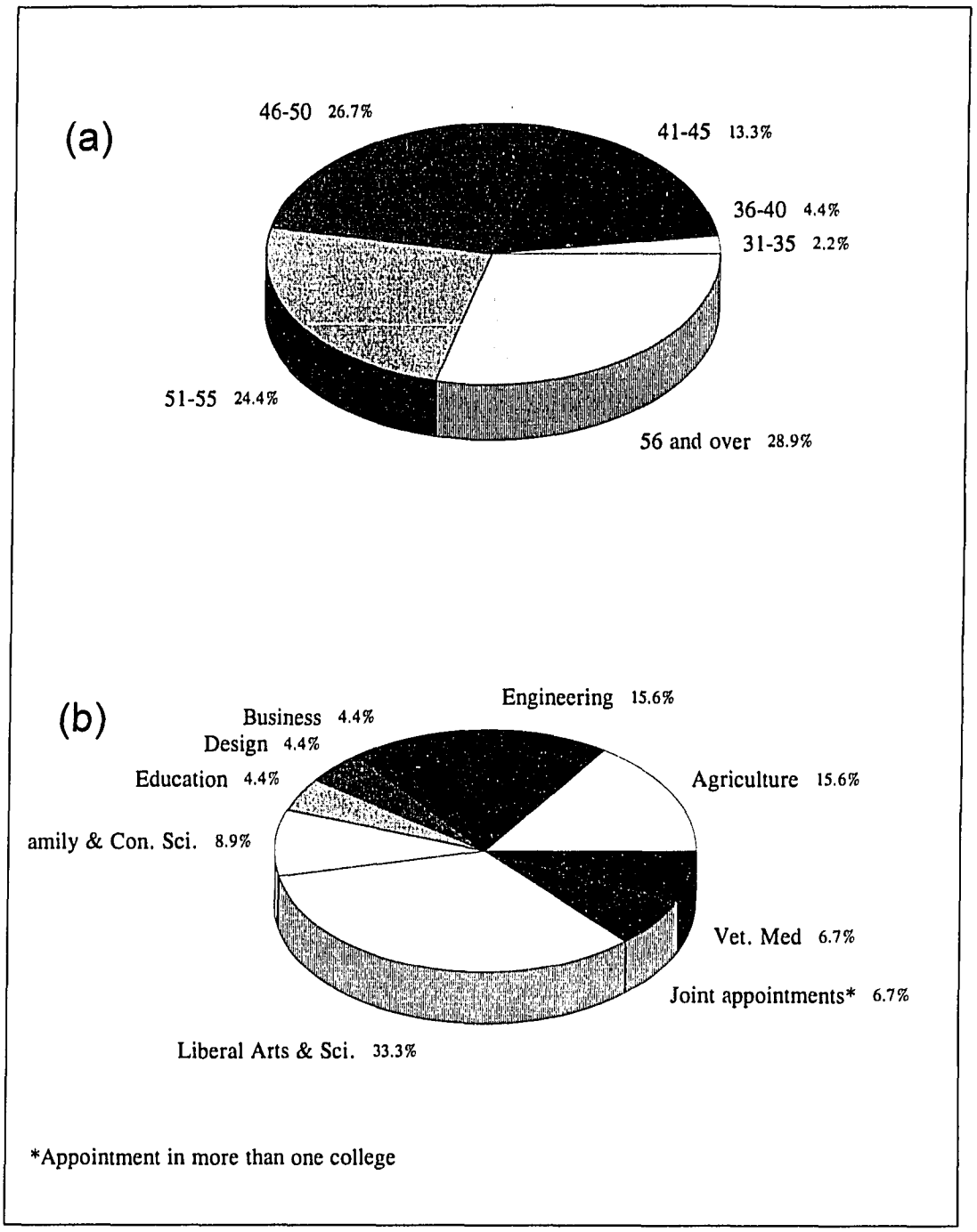


Figure 4.4. Distribution of the DEO Respondents by (a) Age Groups and (b) College of Appointment (N=261).

Academic Rank and Tenure

Faculty sample. The four academic ranks of full professor, associate professor, assistant professor, and instructor were represented (Figure 4.1b). The sample of respondents contained 119 (45.6%) full professors, 83 (31.8%) associate professors, and 59 (22.6%) assistant professors. Two hundred and twelve (81.2%) subjects had achieved tenure and 49 (18.8%) subjects indicated that they had not yet achieved tenure (Figure 4.1c). Tables 4.3 and 4.4 give the frequencies of academic rank and tenure, respectively, by female and male respondents

DEO sample. The four academic ranks of full professor, associate professor, assistant professor, and instructor were represented (Figure 4.3b). The sample of respondents contained 33 (73.3%) full professors, 9 (20.0%) associate professors, and 3 (6.7%) assistant professors. Forty-four (97.8%) subjects had achieved tenure and 1 (2.2%) subjects indicated that they had not yet achieved tenure (Figure 4.3c). Tables 4.5 and 4.6 give the frequencies of academic rank and tenure, respectively, by female and male respondents

Table 4.3. Frequency of Academic Rank by Female and Male Respondents for Faculty Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
Full Professor	13	23.6	106	51.5	119	45.6
Associate Professor	22	40.0	61	29.6	83	31.8
Assistant Professor	20	36.4	39	18.9	59	22.6
Total	55	100	206	100	261	100

Table 4.4. Frequency of Tenure by Female and Male Respondents for Faculty Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
Tenure achieved	40	72.7	172	83.5	212	81.2
Tenure not achieved	15	27.3	34	16.5	49	18.8
Total	55	100	206	100	261	100

Table 4.5. Frequency of Academic Rank by Female and Male Respondents for DEO Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
Full Professor	7	58.3	26	78.8	33	73.3
Associate Professor	5	41.7	4	12.1	9	20.0
Assistant Professor	0	0.0	3	9.1	3	6.7
Total	12	100	33	100	45	100

Table 4.6. Frequency of Tenure by Female and Male Respondents for DEO Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
Tenure achieved	12	100	32	97	44	97.8
Tenure not achieved	0	0	1	3	1	2.2
Total	12	100	33	100	45	100

College

Faculty sample. Faculty from all eight colleges and the Library at Iowa State University were represented in the study (Figure 4.2b). The College of Agriculture was represented by 55 (21.1%) respondents, the College of Business by 9 (3.4%) respondents, Design by 10 (3.8%) respondents, Education by 12 (4.6%) respondents, Engineering by 39 (14.9%) respondents, Family and Consumer Sciences by 15 (5.6%) respondents, Liberal Arts and Sciences by 90 (34.5%) respondents, Veterinary Medicine by 18 (6.9%) respondents, and the Library was represented by eight (3.1%) respondents. In addition, five (1.9%) individuals indicated that they maintained appointments in more than one college. Table 4.7 shows the number of respondents from each college grouped according to gender.

DEO sample. DEOs from all eight colleges and the Library at Iowa State University were represented in the study (Figure 4.4b). The College of Agriculture was represented by 7

(15.6%) respondents, the College of Business by 2 (4.4%) respondents, Design by 2 (4.4%) respondents, Education by 2 (4.4%) respondents, Engineering by 7 (15.6%) respondents, Family and Consumer Sciences by 4 (8.9%) respondents, Liberal Arts and Sciences by 15 (33.3%) respondents, and Veterinary Medicine by 3 (6.7%) respondents. In addition, three (6.7%) individuals indicated that they maintained appointments in more than one college. Table 4.8 shows the number of respondents from each college grouped according to gender.

Table 4.7. Frequency of College of Appointment by Female and Male Respondents for Faculty Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
Agriculture	4	7.3	51	24.8	55	21.1
Business	2	3.6	7	3.4	9	3.4
Design	2	3.6	8	3.9	10	3.8
Education	3	5.5	9	4.4	12	4.6
Engineering	3	5.5	36	17.5	39	14.9
Family & Consumer Sci.	14	25.5	1	0.5	15	5.7
Liberal Arts & Sci.	21	38.2	69	33.5	90	34.5
Veterinary Medicine	2	3.6	16	7.8	18	6.9
Library	4	7.3	4	1.9	8	3.1
Multiple Appointments	0	0.0	5	2.4	5	1.9
Total	55	100	206	100	261	100

Table 4.8. Frequency of College of Appointment by Female and Male Respondents for DEO Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
Agriculture	0	0.0	7	21.2	7	15.6
Business	0	0.0	2	6.1	2	4.4
Design	1	8.3	1	3.0	2	4.4
Education	1	8.3	1	3.0	2	4.4
Engineering	1	8.3	6	18.2	7	15.6
Family & Consumer Sci.	3	25.0	1	3.0	4	8.9
Liberal Arts & Sci.	5	41.7	10	30.3	15	33.3
Veterinary Medicine	1	8.3	2	6.1	3	6.7
Multiple Appointments	0	0.0	3	9.1	3	6.7
Total	12	100	33	100	45	100

Length of Time as a Faculty Member in a Higher Education Institution

Faculty sample. Sixty-eight (26.1%) of the 261 respondents had been a faculty member in a higher education institution for ten years or less, 84 (32.2%) had been a higher education faculty member for 11 to 20 years, and 109 (41.8%) respondents reported being a faculty member in an institution of higher education for over 20 years (Figure 4.1d). Table 4.9 shows the length of time as faculty members in higher education institutions for male and female respondents.

DEO sample. Two (4.4%) of the 45 respondents had been a faculty member in a higher education institution for ten years or less, 18 (40.0%) had been a higher education faculty member for 11 to 20 years, and 25 (55.6%) respondents reported being a faculty member in an institution of higher education for over 20 years (Figure 4.3d). Table 4.10 shows the length of time as faculty members in higher education institutions for male and female respondents.

Table 4.9. Length of Time as a Faculty Member in a Higher Education Institution by Gender for the Faculty Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
10 years or less	16	29.1	52	25.2	68	26.1
11 to 20 years	21	38.2	63	30.6	84	32.2
Over 20 years	18	32.7	91	44.2	109	41.8
Total	55	100	206	100	261	100

Table 4.10. Length of Time as a Faculty Member in a Higher Education Institution by Gender for the DEO Sample

	Female		Male		Total	
	Freq.	%	Freq.	%	Freq.	%
10 years or less	0	0	2	6.1	2	4.4
11 to 20 years	6	50	12	36.4	18	40.0
Over 20 years	6	50	19	57.6	25	55.6
Total	12	100	33	100	45	100

Time Spent on Teaching, Research, Administration, and Service

Tables 4.11 and 4.12 show the percentage of time the respondents spend on the activities of teaching, research, administration, and service. Activities considered as service include serving on committees, consultation, veterinary medicine internships, service to clients, and extension work.

Frequency Distribution of Responses on Attitude Items

Faculty sample. Tables 4.13 and 4.14 show the frequency distribution of all faculty responses on items 9A through 55. Table 4.13 is the frequency distribution of items 9A through 9I which asked the respondents to indicate the degree of importance they assign to the university meeting the needs of various constituent groups. Table 4.14 is the frequency distribution of the remaining attitude items, 10 through 55.

DEO sample. Tables 4.15 and 4.16 show the frequency distribution of all DEO responses on items 9A through 55. Table 4.15 is the frequency distribution of items 9A through 9I which asked the respondents to indicate the degree of importance they assign to the university meeting the needs of various constituent groups. Table 4.16 is the frequency distribution of the remaining attitude items, 10 through 55.

Table 4.11. Frequency of Percentage of Effort Devoted to Teaching, Research, Administration, and Service for Faculty Sample

	No Time Spent		20 percent or Less		21 - 40 Percent		41 - 60 Percent		61 - 80 Percent		81 - 100 Percent	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Teaching	11	4.2	29	11.1	64	24.5	88	33.7	41	15.7	28	10.7
Research	21	8.0	80	30.7	68	26.1	65	24.9	23	8.8	4	1.5
Admin.	125	47.9	108	41.4	14	5.4	6	2.3	7	2.7	1	.4
Service	44	16.9	167	64.0	18	6.9	9	3.4	10	3.8	13	5.0

Table 4.12. Frequency of Percentage of Effort Devoted to Teaching, Research, Administration, and Service for DEO Sample

	No Time Spent		20 percent or Less		21 - 40 Percent		41 - 60 Percent		61 - 80 Percent		81 - 100 Percent	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Teaching	5	11.1	27	60.0	11	24.4	1	2.2	1	2.2	0	0.0
Research	3	6.7	30	66.7	10	22.2	1	2.2	1	2.2	0	0.0
Admin.	1	2.2	3	6.7	7	15.6	10	22.2	14	31.1	10	22.2
Service	5	11.1	34	75.6	4	8.9	1	2.2	1	2.2	0	0.0

Table 4.13. Frequency of Responses of Items 9A through 9I for Faculty

	Not Important		Somewhat Important		Important		Very Important		Extremely Important		Summary Statistics	
Group	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Mean	SD
Student	2	.8	0	0.0	6	2.3	51	19.7	200	77.2	4.73	.58
Parents	19	7.4	69	27.0	110	43.0	44	17.2	14	5.5	2.86	.97
Alumni	21	8.2	95	37.0	98	38.1	33	12.8	10	3.9	2.67	.94
Employers	11	4.3	39	14.7	87	33.7	94	36.4	28	10.9	3.35	1.00
Sta/Loc. Gov.	19	7.4	88	34.2	100	38.9	39	15.2	11	4.3	2.75	.95
Bus./Ind.	12	4.7	69	26.8	102	39.7	60	23.3	14	5.4	2.98	.95
Fed. Gov.	26	10.1	112	43.4	88	34.1	26	10.1	6	2.3	2.51	.89
Faculty	2	.8	9	3.5	47	18.2	99	38.4	101	39.1	4.12	.88
Other Offices	24	10.1	77	32.4	94	39.5	28	11.8	14	5.9	2.70	1.02

Table 4.14. Frequency of Responses of Items 10 through 55 for Faculty**

	Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree		Summary Statistics	
Item	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Mean	SD
10	9	3.4	12	4.6	33	12.6	132	50.6	75	28.7	3.97	.95
11	47	18.1	86	33.1	50	19.2	54	20.8	23	8.8	2.69	1.24
12	12	4.6	26	10.0	73	28.1	123	47.3	26	10.0	3.48	.96
13	1	.4	6	2.3	19	7.3	153	58.6	82	32.4	4.18	.69
14	**5**	**1.9**	**9**	**3.5**	**13**	**5.0**	**130**	**50.0**	**103**	**39.6**	**4.22**	**.84**
15	3	1.2	1	.4	27	10.4	121	46.5	108	41.5	4.27	.75
16	17	6.6	75	29.2	57	22.2	84	32.7	24	9.3	3.09	1.12
17	25	9.8	74	28.9	63	24.6	62	24.2	32	12.5	3.01	1.20
18	9	3.5	37	14.3	54	20.9	126	48.8	32	12.4	3.52	1.00
19	**45**	**17.3**	**130**	**50.0**	**37**	**14.2**	**42**	**16.2**	**6**	**2.3**	**2.36**	**1.02**
20	**81**	**31.4**	**112**	**43.4**	**38**	**14.7**	**20**	**7.8**	**7**	**2.7**	**2.07**	**1.01**
21	**50**	**19.3**	**90**	**34.7**	**70**	**27.0**	**44**	**17.0**	**5**	**1.9**	**2.48**	**1.05**
22	6	2.3	10	3.9	92	35.5	119	45.9	32	12.4	3.62	.84
23	2	.8	20	7.7	35	13.4	150	57.5	54	20.7	3.90	.84
24	18	7.0	80	31.3	88	34.4	49	19.1	21	8.2	2.90	1.05
25	**9**	**3.5**	**67**	**25.8**	**120**	**46.2**	**54**	**20.8**	**10**	**3.8**	**2.96**	**.87**
26	0	0.0	2	.8	6	2.3	130	50.0	122	46.9	4.43	.58
27	6	2.4	25	10.0	79	31.5	115	45.8	26	10.4	3.52	.90
28	**88**	**33.7**	**115**	**44.1**	**42**	**16.1**	**14**	**5.4**	**2**	**.8**	**1.95**	**.89**
29	**49**	**18.9**	**89**	**34.4**	**71**	**27.4**	**43**	**16.6**	**7**	**2.7**	**2.50**	**1.06**
30	16	6.2	57	22.0	78	30.1	81	31.3	27	10.4	3.18	1.08
31	7	2.7	42	16.1	43	16.5	124	47.5	45	17.2	3.61	1.04
32A	0	0.0	7	2.7	14	5.4	152	59.1	84	32.7	4.22	.67
32B	0	0.0	1	.4	14	5.4	148	57.4	95	36.8	4.31	.59
32C	1	.4	26	10.1	36	14.0	134	52.1	60	23.3	3.88	.90
33A	0	0.0	1	.4	7	2.7	148	56.9	104	40.0	4.37	.56
33B	0	0.0	0	0.0	5	1.9	144	55.6	110	42.5	4.41	.53
33C	0	0.0	0	0.0	15	5.8	154	59.2	91	35.0	4.29	.57
34	48	18.4	110	42.6	64	24.8	24	9.3	12	4.7	2.39	1.04
35	**65**	**25.3**	**121**	**47.1**	**48**	**18.7**	**17**	**6.6**	**6**	**2.3**	**2.14**	**.95**
36	**50**	**19.2**	**86**	**33.1**	**60**	**23.1**	**55**	**21.1**	**9**	**3.5**	**2.57**	**1.13**
37	**47**	**18.1**	**136**	**52.3**	**49**	**18.8**	**24**	**9.2**	**4**	**1.5**	**2.24**	**.91**
38	**63**	**24.1**	**80**	**31.4**	**88**	**34.5**	**21**	**8.2**	**3**	**1.2**	**2.30**	**.97**
39	13	5.1	43	16.8	90	35.2	76	29.7	34	13.3	3.29	1.06
40	15	5.8	117	45.0	65	25.0	56	21.5	7	2.7	2.70	.96
41	3	1.2	10	3.9	16	6.2	114	44.0	116	44.8	4.27	.83
42	3	1.2	32	12.4	36	13.9	113	43.6	75	29.0	3.87	1.01
43	**80**	**30.8**	**124**	**47.7**	**38**	**14.6**	**16**	**6.1**	**2**	**.8**	**1.99**	**.88**
44	8	3.1	43	16.6	68	26.3	94	36.3	46	17.8	3.49	1.06
45	6	2.3	16	6.2	48	18.7	91	35.4	96	37.4	3.99	1.01
46	6	2.4	45	17.7	82	32.3	71	28.0	50	19.7	3.45	1.07

Table 4.14. (Continued)

	Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree		Summary Statistics	
Item	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Mean	SD
47	11	4.3	31	12.1	48	18.7	105	40.9	62	24.1	3.69	1.10
48	18	6.9	109	42.1	64	24.7	48	18.5	20	7.7	2.78	1.07
49	**22**	**8.5**	**56**	**21.7**	**84**	**32.6**	**89**	**34.5**	**7**	**2.7**	**3.01**	**1.01**
50	10	3.9	16	6.2	23	8.9	112	43.4	97	37.6	4.05	1.03
51	**38**	**14.8**	**136**	**52.9**	**53**	**20.6**	**20**	**7.8**	**10**	**3.9**	**2.33**	**.95**
52A	9	3.5	31	12.2	56	22.0	130	51.0	29	11.4	3.55	.97
52B	13	5.2	54	21.5	71	28.3	98	39.0	15	6.0	3.19	1.01
53	2	.8	7	2.7	19	7.4	142	55.0	88	34.1	4.19	.75
54	0	0.0	2	.8	25	9.7	137	52.9	95	36.7	4.26	.66
55	**7**	**2.7**	**63**	**24.3**	**55**	**21.2**	**89**	**34.4**	**45**	**17.4**	**3.39**	**1.11**

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.15. Frequency of Responses of Items 9A through 9I for DEOs**

	Not Important		Somewhat Important		Important		Very Important		Extremely Important		Summary Statistics	
Group	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Mean	SD
Student	0	0.0	0	0.0	1	2.2	7	15.6	37	82.2	4.8	.46
Parents	0	0.0	12	26.7	19	42.2	10	22.2	4	8.9	3.13	.92
Alumni	1	2.2	13	28.9	21	46.7	8	17.8	2	4.4	2.93	.86
Employers	0	0.0	8	17.8	12	26.7	14	31.1	11	24.2	3.62	1.05
Sta/Loc. Gov.	2	4.4	11	24.4	21	46.7	9	20.0	2	4.4	2.96	.90
Bus./Ind.	2	4.4	2	28.9	19	42.2	4	8.9	7	15.6	3.02	1.10
Fed. Gov.	3	6.7	18	40.0	16	35.6	7	15.6	1	2.2	2.67	.91
Faculty	1	2.2	2	4.4	6	13.3	19	42.2	17	37.8	4.09	.95
Other Offices	2	4.4	12	26.7	19	42.2	7	15.6	3	6.7	2.93	.96

Table 4.16. Frequency of Responses of Items 10 through 55 for DEOs

	Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree		Summary Statistics	
Item	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Mean	SD
10	0	0.0	2	4.4	5	11.1	22	48.9	16	35.6	4.16	.80
11	8	18.6	17	39.5	9	20.9	6	14.0	3	7.0	2.51	1.16
12	1	2.2	8	17.8	11	24.4	21	46.7	4	8.9	3.42	.97
13	0	0.0	0	0.0	7	1536	27	60.0	11	24.4	4.09	.63
14	**1**	**2.2**	**2**	**4.4**	**2**	**4.4**	**25**	**55.6**	**15**	**33.3**	**4.13**	**.87**
15	0	0.0	0	0.0	7	15.6	18	40.0	20	44.4	4.29	.73
16	6	13.3	20	44.4	7	15.6	10	22.2	1	2.2	2.55	1.07
17	5	11.1	10	22.2	15	33.3	11	24.4	4	8.9	2.98	1.14
18	1	2.3	9	20.5	12	27.3	18	40.9	4	9.1	3.34	.99
19	**8**	**17.8**	**19**	**42.2**	**9**	**20.0**	**8**	**17.8**	**1**	**2.2**	**2.44**	**1.06**
20	**17**	**37.8**	**14**	**31.1**	**12**	**26.7**	**1**	**2.2**	**1**	**2.2**	**2.00**	**.98**
21	**5**	**11.1**	**17**	**37.8**	**14**	**31.1**	**8**	**17.8**	**0**	**0.00**	**2.57**	**.93**
22	0	0.0	3	6.7	14	31.1	22	48.9	6	13.3	3.69	.79
23	0	0.0	3	6.7	5	11.1	33	73.3	4	8.9	3.84	.67
24	2	4.4	10	22.2	26	57.8	5	11.1	2	4.4	2.89	.83
25	**1**	**2.2**	**18**	**40.9**	**18**	**40.9**	**7**	**15.9**	**0**	**0.0**	**2.71**	**.77**
26	0	0.0	0	0.0	1	2.2	26	57.8	18	40.0	4.38	.54
27	1	2.2	3	6.7	10	22.7	26	59.1	4	9.1	3.66	.83
28	**13**	**28.9**	**22**	**48.9**	**8**	**17.8**	**2**	**4.4**	**0**	**0.0**	**1.98**	**.81**
29	**5**	**11.1**	**13**	**28.9**	**17**	**37.8**	**7**	**15.6**	**3**	**6.7**	**2.78**	**1.06**
30	3	6.7	5	11.1	9	20.0	23	52.3	4	9.1	3.46	1.04
31	2	4.4	7	15.6	9	20.0	20	44.4	7	15.6	3.51	1.08
32A	0	0.0	1	2.2	2	4.4	26	57.8	16	35.6	4.27	.65
32B	0	0.0	0	0.0	1	2.2	25	55.6	19	42.2	4.40	.54
32C	0	0.0	4	8.9	9	2.02	23	51.1	9	20.0	3.82	.86
33A	0	0.0	0	0.0	2	4.4	24	53.3	19	42.2	4.39	.58
33B	0	0.0	0	0.0	1	2.2	23	51.1	21	46.7	4.44	.55
33C	0	0.0	0	0.0	2	4.4	29	64.4	14	31.1	4.27	.54
34	7	15.6	20	44.4	11	24.4	7	15.6	0	0.0	2.40	.94
35	**10**	**22.7**	**26**	**59.1**	**5**	**11.4**	**3**	**6.8**	**0**	**0.0**	**2.02**	**.79**
36	**1**	**2.2**	**14**	**31.1**	**10**	**22.2**	**19**	**42.2**	**0**	**0.0**	**3.07**	**.93**
37	**6**	**13.3**	**28**	**62.2**	**7**	**15.6**	**2**	**4.4**	**1**	**2.3**	**2.18**	**.81**
38	**8**	**18.2**	**22**	**50.0**	**11**	**25.0**	**3**	**6.8**	**0**	**0.0**	**2.21**	**.82**
39	2	4.5	6	13.6	3	38.6	4	36.4	3	6.8	3.27	.95
40	2	4.4	24	53.3	9	20.0	10	22.2	0	0.0	2.60	.89
41	0	0.0	1	2.2	2	4.4	23	51.1	19	42.2	4.33	.67
42	0	0.0	7	15.6	12	26.7	17	37.8	9	20.0	3.62	.98
43	**16**	**35.6**	**23**	**51.1**	**2**	**4.4**	**4**	**8.9**	**0**	**0.0**	**1.87**	**.87**
44	1	2.2	11	24.4	13	28.9	15	33.3	5	11.1	3.27	1.03
45	0	0.0	2	4.4	7	15.6	11	24.4	25	55.6	4.31	.90
46	3	6.7	7	15.6	10	22.2	12	26.7	13	28.9	3.56	1.25

Table 4.16. (Continued)

	Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree		Summary Statistics	
Item	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Mean	SD
47	0	0.0	3	6.7	11	24.4	14	31.1	17	37.8	4.00	.95
48	7	15.6	31	68.9	3	6.7	2	4.4	2	4.4	2.13	.89
49	**1**	**2.2**	**9**	**20.0**	**9**	**20.0**	**24**	**53.3**	**2**	**4.4**	**3.38**	**.94**
50	2	4.4	3	6.7	5	11.1	16	35.6	19	42.2	4.04	1.11
51	**13**	**28.9**	**24**	**53.3**	**5**	**11.1**	**3**	**6.7**	**0**	**0.0**	**1.96**	**.82**
52A	0	0.0	4	8.9	10	22.2	23	51.1	6	13.3	3.72	.83
52B	3	7.0	6	14.0	15	34.9	17	39.5	2	4.7	3.21	.99
53	0	0.0	1	2.2	3	6.7	23	51.1	18	40.0	4.29	.70
54	0	0.0	1	2.2	4	8.9	19	42.2	21	46.7	4.33	.74
55	**8**	**18.2**	**10**	**22.7**	**10**	**22.7**	**14**	**31.8**	**2**	**4.5**	**2.82**	**1.21**

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Reliability of the TQIAS

This section reports the results of the reliability test of the TQIAS. Since the scale for items 9A through 9I was different from the other attitude items, two separate sets of reliability estimates were calculated. Chronbach's coefficient alpha was used to determine the reliability of items 9A through 9I and attitude items 10 through 55 on the TQIAS. Chronbach's coefficient alpha is a measure of the test's internal consistency in which single items constitute the units on which the analysis is based (Thorndike, 1992). The results, for the two samples together (Faculty and DEOs) disclosed alpha coefficients of .82 and .79 for Items 9A through 9I and Items 10 through 55 respectively. The same reliability estimates for the faculty sample only were .82 for Items 9A through 9I and .79 for Items 10 through 55. Reliability for the DEO sample was .81 for Items 9A through 9I and .80 for Items 10 through 55.

Comparing Samples and Faculty Subgroups

This section presents the results of testing the hypotheses formulated to answer the research questions. It is divided into two parts, The Item by Item Analysis and The Factor Analysis. A summary of the item by item analysis is provided at the end of the item by item analysis section in Table 4.46.

The Item by Item Analysis

Research Question 1. Do DEOs have significantly different attitudes toward Deming's 14 principles than faculty?

Null hypothesis I There are no significant differences in the mean responses between DEOs and faculty on items 9 through 55 of the TQIAS.

T-tests were used to test for differences between the mean responses of faculty and DEOs on each of the 47 attitude items. The results are presented in Table 4.17 which gives the sample size, mean, and standard deviation of each group.

Several significant differences were found between DEOs and faculty at the .05 level of significance. Significant differences between the two groups were indicated with regard to items 16, 36, 48, 49, 51, and 55. Figure 4.5 graphically depicts the means and the items for some of the significant differences that occured between faculty and DEOs. Thus, the hypothesis of no significant difference between the groups is rejected for these items.

Table 4.17. Mean Scores, Standard Deviations, and T-values for Items 9 through 55 on the TQIAS for Faculty and DEOs by Administrative Status**

	Faculty			DEOs				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 9								
Student	259	4.73	.58	45	4.80	.46	-.81	.42
Parents	256	2.86	.04	45	3.13	.92	-1.73	.08
Alumni	257	2.67	.06	45	2.93	.86	-1.74	.08
Employers	258	3.35	.06	45	3.62	1.05	-1.68	.09
Sta/Loc. Gov.	257	2.75	.06	45	2.96	.90	-1.37	.17
Bus./Ind.	257	2.98	.06	45	3.02	1.10	-.26	.79
Fed. Gov.	258	2.51	.89	45	2.67	.91	-1.07	.28
Faculty	258	4.12	.89	45	4.09	.95	.19	.85
Other Offices	238	2.70	1.02	43	2.93	.96	-1.39	.16
Item 10	262	3.97	.95	45	4.16	.80	-1.24	.22
Item 11	261	2.69	1.23	43	2.51	1.16	.90	.37
Item 12	261	3.48	.97	45	3.42	.97	.34	.73
Item 13	262	4.19	.70	45	4.90	.63	.90	.38
Item 14	**261**	**4.21**	**.85**	**45**	**4.13**	**.87**	**.56**	**.58**
Item 15	261	4.27	.75	45	4.29	.73	-.17	.86
Item 16	258	3.10	.73	44	2.55	1.07	3.03	.00*
Item 17	257	3.02	1.20	45	2.98	1.14	.20	.84
Item 18	259	3.51	1.01	44	3.34	.99	1.05	.29
Item 19	**261**	**2.36**	**1.02**	**45**	**2.44**	**1.06**	**-.53**	**.60**
Item 20	**259**	**2.07**	**1.00**	**45**	**2.00**	**.98**	**.41**	**.69**
Item 21	**260**	**2.47**	**1.05**	**44**	**2.57**	**.93**	**-.59**	**.56**
Item 22	260	3.63	.84	45	3.69	.80	-.46	.65
Item 23	262	3.90	.84	45	3.84	.67	.43	.67
Item 24	257	2.91	1.06	45	2.89	.83	.13	.90
Item 25	**261**	**2.95**	**.88**	**44**	**2.70**	**.77**	**1.75**	**.08**
Item 26	261	4.43	.58	45	4.38	.54	.59	.55
Item 27	252	3.52	.90	44	3.66	.83	-.93	.35
Item 28	**262**	**1.95**	**.89**	**45**	**1.98**	**.81**	**-.19**	**.85**
Item 29	**260**	**2.50**	**1.06**	**45**	**2.78**	**1.06**	**-1.66**	**.10**
Item 30	260	3.18	1.09	44	3.46	1.04	-1.53	.13
Item 31	262	3.61	1.04	45	3.51	1.08	.60	.56
Item 32A	258	4.22	.67	45	4.27	.65	-.43	.67
Item 32B	259	4.30	.59	45	4.40	.54	-.97	.33
Item 32C	258	3.87	.90	45	3.82	.86	.34	.73
Item 33A	261	4.37	.56	45	4.40	.54	-.36	.72
Item 33B	260	4.41	.53	45	4.67	.51	-.69	.49
Item 33C	261	4.30	.57	45	4.27	.54	.27	.79
Item 34	259	2.40	1.04	45	2.40	.94	-.04	.97
Item 35	**258**	**2.13**	**.95**	**44**	**2.02**	**.79**	**.72**	**.47**

Table 4.17. (Continued)

	Faculty			DEOs				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 36	**261**	**2.56**	**1.13**	**44**	**3.07**	**.93**	**-2.84**	**.01***
Item 37	**261**	**2.23**	**.91**	**44**	**2.18**	**.82**	**.36**	**.72**
Item 38	**256**	**2.30**	**.97**	**44**	**2.20**	**.82**	**.62**	**.54**
Item 39	257	3.29	1.06	44	3.27	.95	.09	.93
Item 40	261	2.70	.96	45	2.60	.89	.66	.51
Item 41	260	4.27	.83	45	4.33	.67	-.46	.65
Item 42	260	3.87	1.00	45	3.62	.98	1.53	.13
Item 43	**261**	**1.99**	**.88**	**45**	**1.87**	**.87**	**.83**	**.40**
Item 44	260	3.50	1.06	45	3.27	1.03	1.34	.18
Item 45	258	4.00	1.01	45	4.31	.90	-1.96	.05
Item 46	255	3.45	1.07	45	3.56	1.25	-.61	.54
Item 47	258	3.69	1.10	45	4.00	.95	-1.78	.08
Item 48	260	2.78	1.07	45	2.13	.90	3.81	.00*
Item 49	259	3.01	1.01	45	3.38	.93	-2.30	.02*
Item 50	259	4.05	1.03	45	4.04	1.11	.03	.97
Item 51	**258**	**2.33**	**.96**	**45**	**1.96**	**.82**	**2.44**	**.02***
Item 52A	256	3.55	.97	43	3.72	.83	-1.12	.27
Item 52B	252	3.19	1.01	43	3.21	.99	-.09	.93
Item 53	259	4.20	.75	45	4.29	.70	-.80	.42
Item 54	260	4.26	.66	45	4.33	.74	-.70	.49
Item 55	**260**	**3.40**	**1.12**	**44**	**2.82**	**1.21**	**3.16**	**.00***

*Significant at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

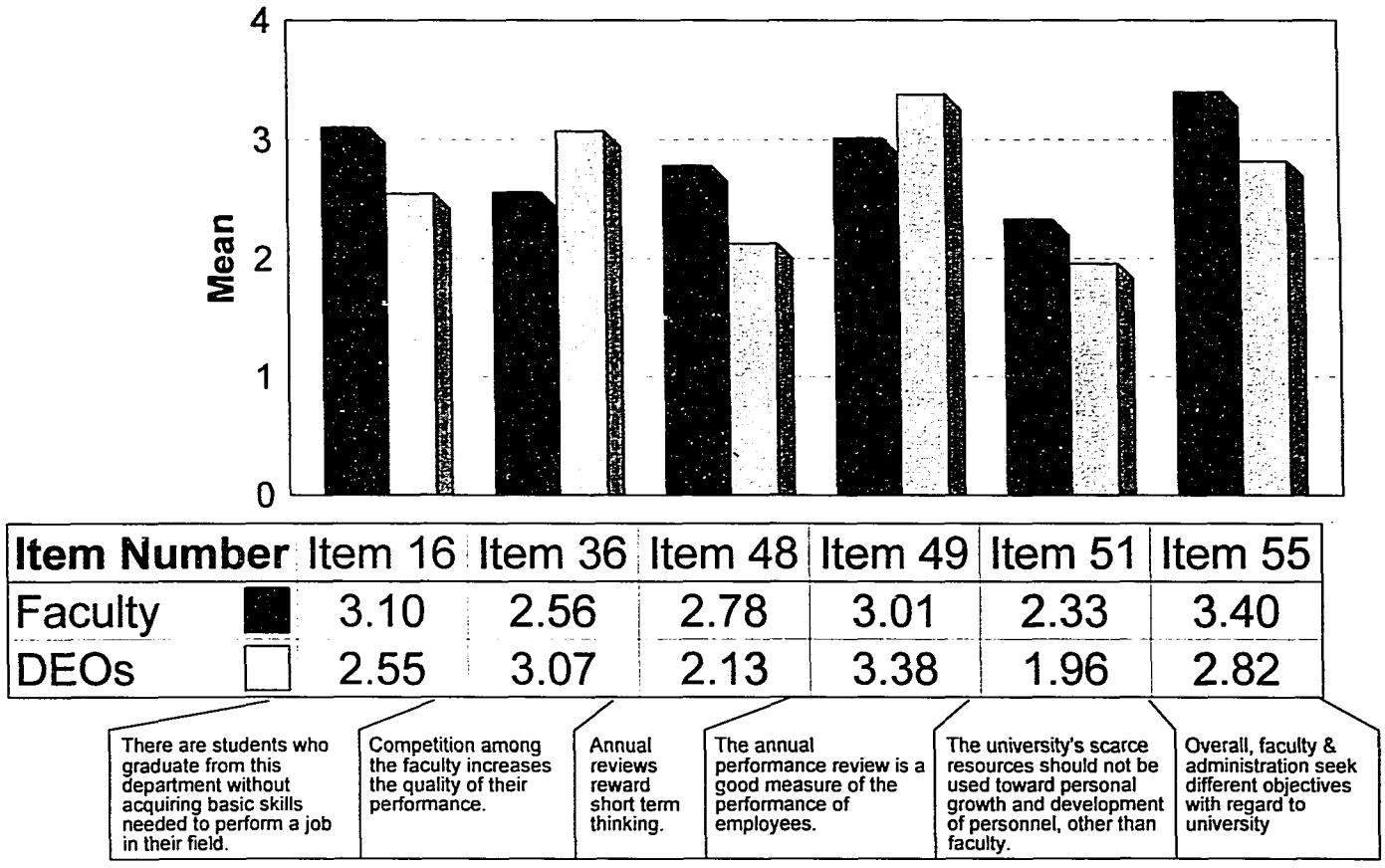


Figure 4.5. Bar Diagrams Depicting the Mean Scores of Faculty and Department Executive Officers on Items 16, 36, 48, 49, 51, and 55. Significant Differences Were Found Among These Items Across Administrative Appointment.

Research Question 2. Are there significant differences in the attitudes of faculty at Iowa State University toward Deming's 14 principles when the effects of the variables of academic rank, gender, college, age, tenure, and length of time as a faculty member are considered?

Null Hypothesis II There are no significant differences in the mean responses among faculty in different academic ranks on items 9 through 55 of the TQIAS.

One-way ANOVAs were used to test for differences among the mean responses on each of the 47 attitude items of faculty in the different academic ranks of full associate, or assistant professor. The results are presented in Table 4.18. Several differences in responses among the three groups were apparent at the .05 level of significance. Further, the Student-Newman-Keuls (SNK) procedure and Scheffe's multiple comparison procedure were used to determine between which groups significant differences existed. Since Scheffe's test of multiple comparison is conservative and the differences between means will be rather large before the test will detect them as significant, a second, less conservative test, SNK, was also employed during the analysis.

At the .05 level of significance, differences were indicated on items 9B, 19, 28, 29, 30, 40, 43, and 44. Figure 4.6 graphically depicts the means and the items for some of the significant differences that occured among full, associate, and assistant faculty. Most of the differences occurred between the full professors and one or both of the other ranks.

Null Hypothesis III There are no significant differences in the mean responses between male and female faculty on items 9 through 55 of the TQIAS.

T-tests were used to test for differences between the mean responses of male and female faculty on each of the 47 attitude items. The results are presented in Table 4.19.

Table 4.18. Mean Scores, Standard Deviations, and F-values for Items 9A through 55 on the TQIAS for Faculty by Academic Rank**

	Full Professor			Assoc. Professor			Asst. Professor			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 9											
Student	119	4.78	.52	81	4.68	.65	59	4.68	.60	1.00	.37
Parent[1]	119	2.99[a]	.91	80	2.94[b]	1.02	57	2.49[c]	.95	5.66	.00*
Alumni	118	2.73	.91	80	2.65	.98	59	2.59	.93	.45	.64
Employers	118	3.31	1.04	81	3.41	.89	59	3.34	1.08	.21	.81
Business/Ind	119	3.00	.91	80	2.90	.96	58	3.05	1.03	.47	.63
Sta./Loc. Gov.	119	2.73	.96	80	2.81	.94	58	2.69	.94	.31	.73
Federal Gov.	119	2.47	.83	80	2.55	.95	59	2.54	.93	.23	.79
Faculty	119	4.08	.93	80	4.06	.89	59	4.25	.76	.96	.39
Other Offices	106	2.71	1.00	78	2.63	.98	54	2.78	1.09	.35	.70
Item 10	119	3.92	.91	83	4.05	.87	59	3.93	1.14	.46	.63
Item 11	119	2.64	1.24	82	2.72	1.21	59	2.76	1.28	.23	.80
Item 12	118	3.42	.92	83	3.49	.93	59	3.59	1.10	.68	.51
Item 13	119	4.19	.68	83	4.17	.68	59	4.19	.75	.03	.97
Item 14	**119**	**4.18**	**.86**	**83**	**4.30**	**.87**	**58**	**4.17**	**.78**	**.58**	**.56**
Item 15	119	4.16	.86	83	4.33	.61	58	4.41	.68	2.58	.08
Item 16	119	2.95	1.15	81	3.17	1.16	57	3.26	.97	1.85	.16
Item 17	118	2.84	1.15	80	3.24	1.15	58	3.03	1.30	2.71	.07
Item 18	118	3.41	1.00	81	3.51	1.00	59	3.78	.97	2.80	.06
Item 19[2]	**118**	**2.54[d]**	**1.05**	**83**	**2.35**	**1.04**	**59**	**2.02[e]**	**.84**	**5.39**	**.01***
Item 20	**117**	**2.12**	**.92**	**83**	**2.02**	**1.05**	**58**	**2.03**	**1.12**	**.26**	**.77**
Item 21	**118**	**2.61**	**1.05**	**83**	**2.39**	**1.02**	**58**	**2.33**	**1.07**	**1.88**	**.16**
Item 22	119	3.54	.86	83	3.61	.73	57	3.81	.91	2.01	.14
Item 23	119	3.97	.81	83	3.88	.85	59	3.76	.90	1.28	.28
Item 24	118	2.92	1.03	80	2.83	1.04	58	2.98	1.13	.39	.68
Item 25	**119**	**2.97**	**.87**	**82**	**3.00**	**.94**	**59**	**2.88**	**.77**	**.33**	**.72**
Item 26	119	4.36	.63	82	4.45	.52	59	4.54	.54	2.00	.14
Item 27	115	3.49	.87	79	3.52	.93	57	3.58	.91	.20	.82
Item 28[3]	**119**	**2.08[f]**	**.90**	**83**	**1.93**	**.85**	**59**	**1.73[g]**	**.87**	**3.29**	**.04***
Item 29[4]	**118**	**2.69[h]**	**1.15**	**82**	**2.39[i]**	**.95**	**59**	**2.25[j]**	**.96**	**4.10**	**.02***
Item 30[5]	119	2.98[k]	1.06	81	3.16[l]	1.11	59	3.59[m]	.98	6.56	.00*
Item 31	119	3.52	.98	83	3.54	1.13	59	3.86	.97	2.43	.09
Item 32A	117	4.23	.59	83	4.11	.73	57	4.35	.69	2.30	.10
Item 32B	119	4.30	.53	80	4.23	.64	59	4.42	.62	1.96	.14
Item 32C	118	3.91	.92	81	3.78	.89	58	3.97	.86	.84	.43
Item 33A	119	4.36	.50	83	4.33	.61	58	4.43	.60	.62	.54
Item 33B	119	4.38	.50	81	4.41	.52	59	4.46	.60	.44	.64
Item 33C	119	4.24	.55	82	4.32	.59	59	4.36	.58	.88	.42
Item 34	118	2.38	1.11	82	2.34	1.02	58	2.47	.92	.24	.78
Item 35	**118**	**2.17**	**.95**	**81**	**2.22**	**1.06**	**58**	**1.95**	**.76**	**1.55**	**.21**

Table 4.18. (Continued)

	Full Professor			Assoc. Professor			Asst. Professor			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 36	**119**	**2.71**	**1.17**	**83**	**2.48**	**1.14**	**58**	**2.40**	**.97**	**1.82**	**.16**
Item 37	**119**	**2.20**	**.93**	**82**	**2.38**	**.90**	**59**	**2.12**	**.87**	**1.59**	**.21**
Item 38	**117**	**2.21**	**.92**	**81**	**2.28**	**.98**	**57**	**2.51**	**1.04**	**1.90**	**.15**
Item 39	118	3.22	1.08	81	3.40	1.07	57	3.30	1.00	.66	.52
Item 40[6]	119	2.61[n]	.87	83	2.98[o]	1.00	58	2.52[p]	1.01	5.24	.01*
Item 41	119	4.16	.87	82	4.28	.91	58	4.50	.57	3.31	.04
Item 42	119	3.80	.99	82	3.96	1.00	58	3.88	1.06	.66	.52
Item 43[7]	**119**	**1.86[q]**	**.87**	**82**	**2.21[r]**	**.87**	**59**	**1.93**	**.87**	**4.09**	**.02***
Item 44[8]	119	3.31[s]	1.06	81	3.70[t]	.93	59	3.56	1.19	3.53	.03*
Item 45	117	4.05	1.04	83	3.95	.91	57	3.93	1.10	.37	.69
Item 46	116	3.44	1.07	80	3.43	1.00	58	3.50	1.16	.09	.91
Item 47	119	3.70	1.10	81	3.57	1.01	57	3.82	1.20	.93	.40
Item 48	118	2.69	1.09	82	2.91	1.04	59	2.76	1.07	1.03	.36
Item 49	**119**	**3.09**	**1.02**	**82**	**2.85**	**1.00**	**57**	**3.07**	**1.00**	**1.49**	**.23**
Item 50	118	3.96	1.07	83	4.20	.95	57	4.00	1.05	1.48	.23
Item 51	**119**	**2.29**	**.90**	**83**	**2.41**	**1.05**	**55**	**2.29**	**.94**	**.42**	**.66**
Item 52A	117	3.46	1.03	81	3.54	.87	57	3.72	.96	1.37	.26
Item 52B	116	3.19	1.04	79	3.23	.96	56	3.14	1.03	.12	.89
Item 53	119	4.18	.80	82	4.17	.64	57	4.23	.78	.10	.90
Item 54	119	4.31	.62	83	4.23	.65	57	4.18	.73	.92	.40
Item 55	**119**	**3.25**	**1.24**	**83**	**3.51**	**1.03**	**57**	**3.53**	**.93**	**1.80**	**.17**

[1]SNK's and Scheffe's test: c is significantly different from a and b.

[2]SNK's and Scheffe's test: d is significantly different from e.

[3]SNK's and Scheffe's test: f is significantly different from g.

[4] SNK's and Scheffe's test: h is significantly different from j. SNK's test: h is significantly different from i.

[5] SNK's and Scheffe's test: k is significantly different from m. SNK's test: l is significantly different from m.

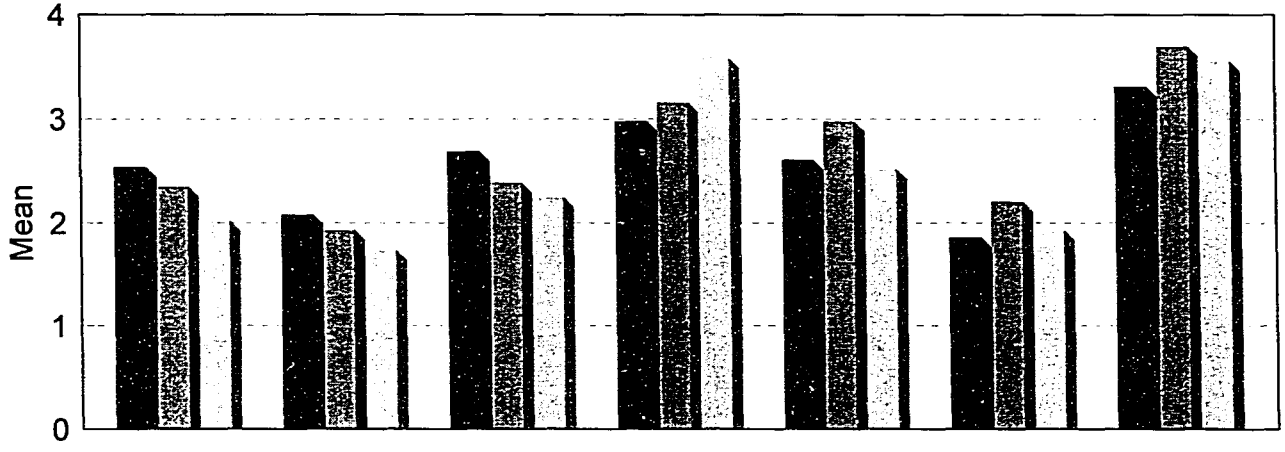
[6] SNK's and Scheffe's test: o is significantly different from n and p.

[7] SNK's and Scheffe's test: q is significantly different from r.

[8] SNK's and Scheffe's test: s is significantly different from t.

*Significant difference at $\alpha = .05$ level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI



Item	19	28	29	30	40	43	44
Full	2.54	2.08	2.69	2.98	2.61	1.86	3.31
Associate	2.35	1.93	2.39	3.16	2.98	2.21	3.70
Assistant	2.02	1.73	2.25	3.59	2.52	1.93	3.56

19	28	29	30	40	43	44
The major objective of tests is to distinguish the good students from the bad ones.	Faculty with high credentials in their subject matter don't need training in pedagogical skills.	The best teachers are the ones who have high credentials in their field of study.	It is essential that the university have ongoing training programs for each position within the university.	Encouraging poorly performing students to study harder is seldom effective.	Budgets should be allocated to academic departments based entirely on student credit hours.	Basing scholarly growth on the number of publications reduces the quality of research.

Figure 4.6. Bar Diagrams Depicting the Mean Scores of Faculty Across Academic Rank on Items 19, 28, 29, 30, 40, 43, and 44. Significant Differences Were Found Among These Items Across Academic Rank.

Table 4.19. Mean Scores, Standard Deviations, and T-values for Items 9 through 55 on the TQIAS for Faculty By Gender**

	Males			Females				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 9								
Student	205	4.71	.62	54	4.78	.42	-.74	.46
Parents	203	2.90	.97	53	2.72	.99	1.23	.22
Alumni	203	2.71	.96	54	2.54	.84	1.20	.23
Employers	205	3.35	.98	53	3.36	1.08	-.08	.94
Sta/Loc. Gov.	205	2.78	.94	52	2.63	.97	.96	.34
Bus./Ind.	205	3.00	.94	52	2.90	1.02	.65	.52
Fed. Gov.	205	2.53	.89	53	2.45	.89	.54	.59
Faculty	204	4.00	.91	54	4.54	.61	-4.07	.00*
Other Offices	188	2.64	.98	50	2.92	1.12	-1.75	.08
Item 10	206	3.94	.93	55	4.05	1.06	-.78	.44
Item 11	205	2.61	1.20	55	3.00	1.32	-2.09	.04*
Item 12	205	3.46	.95	55	3.55	1.02	-.56	.58
Item 13	206	4.17	.69	55	4.22	.71	-.41	.68
Item 14	**206**	**4.25**	**.80**	**54**	**4.09**	**1.00**	**1.24**	**.22**
Item 15	206	4.21	.78	54	4.50	.58	-2.55	.01*
Item 16	204	3.11	1.09	53	3.02	1.25	.51	.61
Item 17	201	2.99	1.16	55	3.09	1.32	-.58	.56
Item 18	205	3.55	.96	53	3.42	1.15	.88	.38
Item 19	**205**	**2.45**	**1.02**	**55**	**2.04**	**.98**	**2.69**	**.01***
Item 20	**204**	**2.11**	**1.01**	**54**	**1.91**	**.98**	**1.33**	**.18**
Item 21	**206**	**2.54**	**1.05**	**53**	**2.21**	**.99**	**2.10**	**.04***
Item 22	205	3.58	.84	54	3.80	.81	-1.73	.09
Item 23	206	3.87	.81	55	3.98	.95	-.85	.40
Item 24	202	2.92	1.01	54	2.83	1.21	.54	.59
Item 25	**205**	**2.97**	**.91**	**55**	**2.91**	**.73**	**.47**	**.64**
Item 26	205	4.37	.59	55	4.67	.47	-3.55	.00*
Item 27	199	3.48	.91	52	3.67	.83	-1.41	.16
Item 28	**206**	**1.99**	**.89**	**55**	**1.82**	**.86**	**1.28**	**.20**
Item 29	**204**	**2.52**	**1.06**	**55**	**2.42**	**1.08**	**.63**	**.53**
Item 30	205	3.11	1.07	54	3.44	1.11	-2.05	.04*
Item 31	206	3.52	1.04	55	3.93	.98	-2.63	.01*
Item 32A	204	4.22	.68	53	4.23	.61	-.10	.92
Item 32B	204	4.23	.59	54	4.26	.59	.66	.51
Item 32C	203	3.85	.92	54	3.98	.79	-.94	.35
Item 33A	206	4.35	.56	54	4.41	.53	-.62	.53
Item 33B	205	4.40	.53	54	4.43	.54	-.32	.75
Item 33C	205	4.26	.57	55	4.42	.53	-1.86	.06
Item 34	204	2.38	1.04	54	2.41	1.04	-.16	.88
Item 35	**202**	**2.20**	**.97**	**55**	**1.91**	**.85**	**2.02**	**.05***

Table 4.19. (Continued)

	Males			Females				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 36	**206**	**2.69**	**1.12**	**54**	**2.09**	**1.03**	**3.55**	**.00***
Item 37	**206**	**2.30**	**.87**	**54**	**2.00**	**1.03**	**2.19**	**.03***
Item 38	**202**	**2.27**	**.93**	**53**	**2.40**	**1.12**	**-.83**	**.41**
Item 39	203	3.21	1.03	53	3.62	1.10	-2.58	.01*
Item 40	205	2.70	.93	55	2.73	1.08	-.20	.84
Item 41	205	4.20	.88	54	4.57	.54	-3.02	.00*
Item 42	205	3.81	1.01	54	4.07	.99	-1.26	.09
Item 43	**205**	**1.98**	**.85**	**55**	**2.02**	**.99**	**-.32**	**.75**
Item 44	205	3.42	1.05	54	3.74	1.07	-1.96	.05*
Item 45	203	3.98	1.03	54	4.04	.95	-.37	.72
Item 46	200	3.46	1.06	54	3.41	1.13	.32	.75
Item 47	204	3.62	1.11	53	3.92	1.02	-1.79	.07
Item 48	205	2.79	1.02	54	2.76	1.27	.16	.87
Item 49	**205**	**3.00**	**1.00**	**53**	**3.06**	**1.05**	**-.36**	**.72**
Item 50	205	4.01	1.08	53	4.19	.83	-1.13	.26
Item 51	**205**	**2.38**	**.96**	**52**	**2.15**	**.92**	**1.50**	**.14**
Item 52A	203	3.49	.99	52	3.77	.85	-1.88	.06
Item 52B	199	3.12	1.01	52	3.46	.96	-2.18	.03*
Item 53	205	4.13	.78	53	4.42	.57	-2.48	.01*
Item 54	206	4.21	.65	53	4.42	.66	-2.00	.05*
Item 55	**206**	**3.41**	**1.10**	**53**	**3.32**	**1.16**	**.53**	**.59**

*Significant at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Several significant differences were found between male and female respondents at the .05 level of significance. Significant differences between the two groups were indicated with regard to items 9H, 15, 19, 21, 26, 30, 31, 35, 36, 37, 39, 41, 44, 52B, 53, and 54. Figures 4.7 and 4.8 graphically depict the means and the items for some of the significant differences that occured between male and female faculty. Thus, the hypothesis of no significant difference between the groups is rejected for these items.

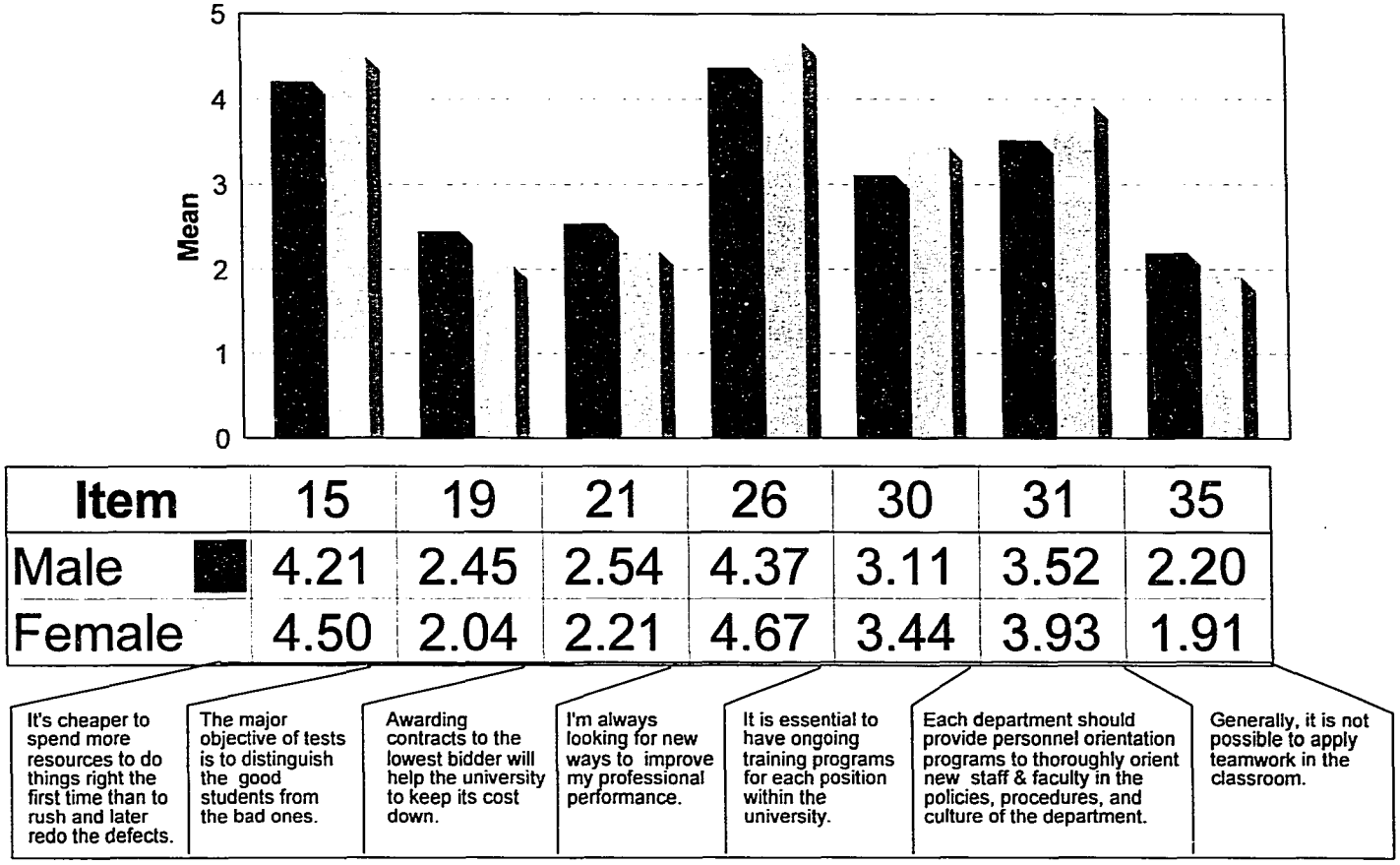


Figure 4.7. Bar Diagrams Depicting the Mean Scores of Faculty Across Gender on Items 15, 19, 21, 26, 30, 31, and 35. Significant Differences Were Found Among These Items Across Gender.

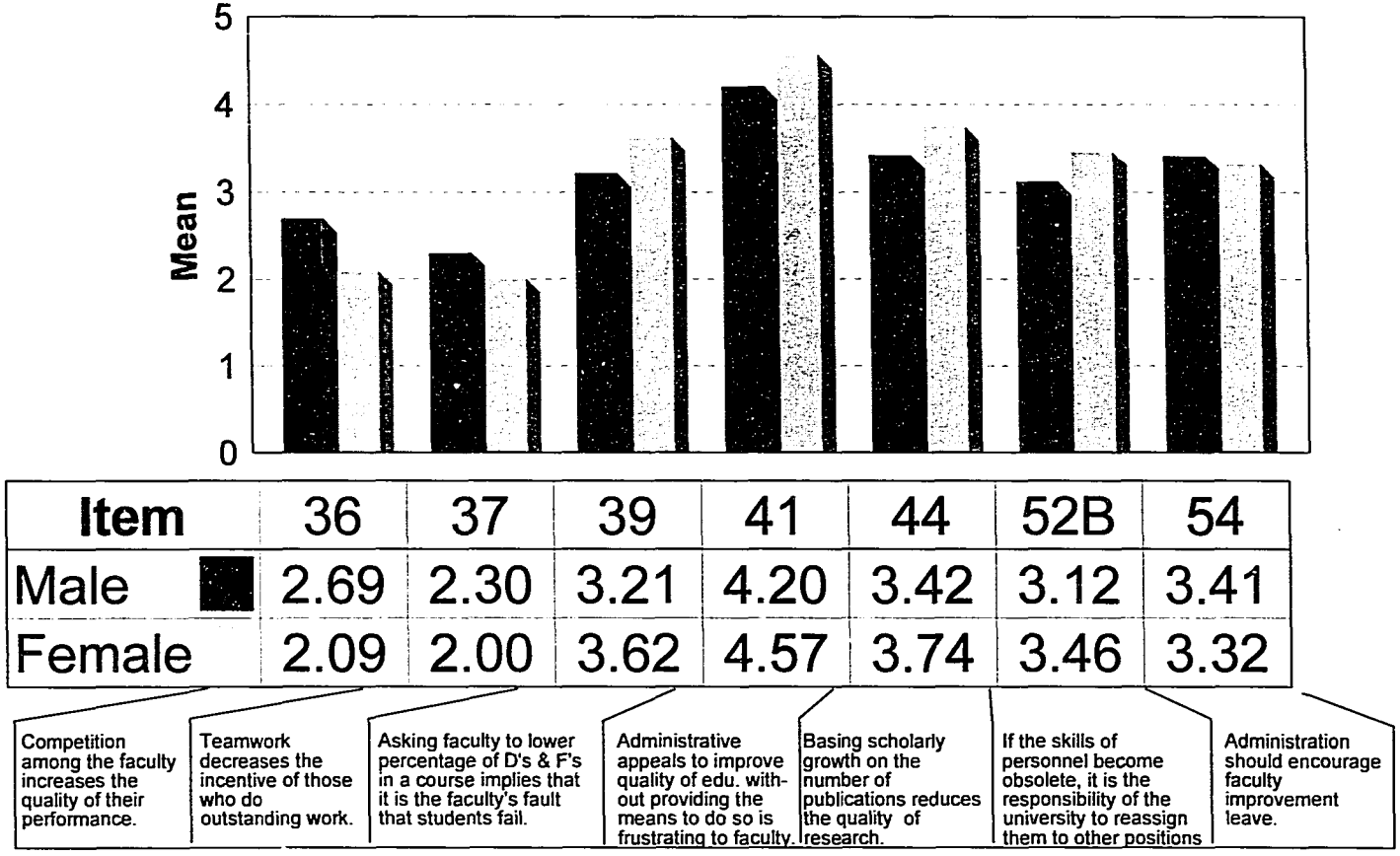


Figure 4.8. Bar Diagrams Depicting the Mean Scores of Faculty Across Gender on Items 36, 37, 39, 41, 44, 52B, and 54. Significant Differences Were Found Among These Items Across Gender.

Null Hypothesis IV There are no significant differences in the mean responses among faculty employed in different colleges on items 9 through 55 of the TQIAS.

Differences were indicated at a .05 significance level among respondents according to their college of appointment. The nine groups, including library, agriculture, business administration, design, education, engineering, family and consumer sciences, liberal arts and sciences, and veterinary medicine were compared using ANOVA. Both SNK and Scheffe procedures were employed to reveal between what groups the differences existed. The results are shown in Tables 4.20 through 4.31. In several of the items in which significant differences between the groups were revealed, the differences were between the college of liberal arts and sciences and one or more of the other colleges. At the .05 level of significance, differences were indicated on items 9C, 9E, 10, 13, 15, 21, 27, 29, 30, 31, 36, 37, 44, and 54. Figures 4.9 through 4.15 graphically depict the means and the items for some of the significant differences that occured among the colleges. The null hypothesis is rejected for these items.

Null Hypothesis V There are no significant differences in the mean responses among faculty in different age ranges on items 9 through 55 of the TQIAS.

One-way ANOVAs were used to test for differences among the mean responses on each of the 47 attitude items of faculty in different age ranges. The results are presented in Tables 4.32 through 4.43. The SNK procedure detected only one significant difference among the age groups for items 9 through 55. This difference appears in item 54, (Administration should encourage faculty improvement leave.) in which the 36 - 40 group is significantly different from the groups of 41 - 50, 46 - 50, 51 - 55, and 56 and over. No other significant differences were indicated on the remaining items. The null hypothesis of no significant difference is rejected for item 54.

Table 4.20. Mean Scores, Standard Deviations, and F-values for Items 9A through 9E on the TQIAS for Faculty by College of Appointment

	Student			Parent			Alumni[1]			Employer[2]			Bus./Ind.[3]		
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD
Library	8	4.88	.35	8	2.88	.83	8	2.75	.46	8	3.00	.93	8	3.00	.76
Agriculture	55	4.78	.63	55	3.05	1.03	55	2.87[a]	.98	54	3.52	1.06	55	3.16[b]	.96
Bus. Admin.	9	4.67	.50	9	3.00	.87	9	3.11	.60	9	3.56	.73	9	3.22	.67
Design	10	4.70	.48	10	2.80	.79	9	2.11[c]	.78	10	3.20	.79	10	2.40	.70
Education	12	4.83	.58	12	3.00	1.04	12	2.25[d]	.97	12	3.42	1.31	12	3.25	1.22
Engineering	39	4.77	.48	38	2.95	.99	38	2.79[e]	.93	39	3.56	.88	39	3.38[f]	.85
Fam. & Con. Sci	15	4.87	.35	15	2.87	1.19	15	2.93	.96	15	3.80	.94	14	3.36	1.08
Lib. Arts & Sci.	88	4.64	.65	86	2.57	.88	88	2.36[g]	.85	88	3.08	1.00	87	2.60[h]	.87
Veterinary Med.	18	4.61	.70	18	3.06	.87	18	3.28[i]	.67	18	3.17	.71	18	2.89	.76
F - Value		.66			1.47			4.14			1.97			4.33	
F - Prob.		.73			.17			.00*			.05*			.00*	

[1]SNK's test: g is significantly different from a, e, and i. i is significantly different from c and d. Scheffe test: a is significantly different from i

[2]No groups were found to be significantly different

[3]SNK's and Scheffe's tests: h is significantly different from a and f.

*Significant difference at .05 level.

Table 4.21. Mean Scores, Standard Deviations, and F-values for Items 9F through 10 on the TQIAS for Faculty by College of Appointment

	State/Loc.			Fed. Gov.			Faculty			Other Offices			Item 10[1]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	2.50	.53	8	2.00	.53	8	4.63	.52	7	3.29	1.25	8	4.00	.76
Agriculture	55	2.89	.98	55	2.53	.88	55	3.91	.99	54	2.69	1.10	55	3.98[a]	.95
Bus. Admin.	9	2.67	1.22	9	2.56	1.13	9	4.11	1.17	9	2.67	1.00	9	4.33	.50
Design	10	2.50	.71	10	2.40	.52	10	4.00	.67	17	2.71	.76	10	4.00	.82
Education	12	2.83	1.19	12	2.50	1.17	12	4.33	.78	12	2.67	.89	12	4.50	.67
Engineering	39	2.85	.87	39	2.62	.94	39	4.03	.93	38	2.74	.95	39	4.13[b]	.66
Fam. & Con. Sci	13	3.23	1.01	14	2.93	1.21	15	4.53	.64	14	3.21	.89	15	4.33	.82
Lib. Arts & Sci.	88	2.50	.88	88	2.36	.80	87	4.17	.80	79	2.46	.97	90	3.61[c]	1.09
Veterinary Med.	18	2.94	.80	18	2.67	.69	18	4.00	.91	15	2.87	.99	18	4.39[d]	.92
F - Value		1.74			1.20			1.43			1.41			3.25	
F - Prob.		.09			.30			.18			.19			.00*	

[1]SNK's test: c is significantly different from a, b, and d; Scheffe's test: c is significantly different from d

* Significant difference at .05 level.

Table 4.22. Mean Scores, Standard Deviations, and F-values for Items 11 through 15 on the TQIAS for Faculty by College of Appointment**

	Item 11			Item 12			Item 13[1]			Item 14			Item 15[2]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	2.63	1.30	8	3.75	.71	8	4.25	.46	**8**	**4.50**	**.53**	8	4.13	.64
Agriculture	55	2.47	1.33	55	3.33	1.17	55	4.31[a]	.63	**55**	**4.24**	**.86**	55	3.96[b]	.94
Bus. Admin.	9	2.78	1.30	9	3.89	.78	9	4.22	.44	**9**	**4.22**	**.44**	9	4.22	.67
Design	10	3.10	1.10	10	3.20	.63	10	4.10	.57	**10**	**4.40**	**.52**	10	4.30	.67
Education	12	2.42	1.00	12	3.58	.79	12	4.50	.52	**12**	**3.75**	**.97**	12	4.58	.51
Engineering	38	3.08	1.02	38	3.71	.80	39	4.31[c]	.52	**38**	**4.21**	**.93**	38	4.42[d]	.64
Fam. & Con. Sci.	15	2.87	1.19	15	3.67	1.11	15	4.53[e]	.64	**15**	**3.73**	**1.03**	15	4.47	.52
Lib. Arts & Sci.	90	2.52	1.25	90	3.32	.95	90	3.91[f]	.82	**90**	**4.29**	**.86**	90	4.28	.75
Veterinary Med.	18	3.06	1.35	18	3.67	.91	18	4.33	.59	**18**	**4.28**	.57	18	4.56	.51
F - Value		1.36			1.30			3.23			**1.34**			2.16	
F - Prob.		.21			.24			.00*			**.22**			.03*	

1SNK's test: f is significantly different from a, c, and e.
2SNK's test: b is significantly different from d
* Significant difference at .05 level.
**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.23. Mean Scores, Standard Deviations, and F-values for Items 16 through 20 on the TQIAS for Faculty by College of Appointment**

	Item 16			Item 17			Item 18			Item 19			Item 20		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.25	1.39	8	2.75	1.28	7	3.57	.98	**7**	**2.00**	**.58**	**7**	**1.71**	**.76**
Agriculture	54	2.76	1.10	55	2.76	1.22	55	3.45	1.10	**55**	**2.47**	**1.09**	**54**	**1.93**	**.97**
Bus. Admin.	9	2.44	.88	9	2.00	.50	9	3.44	.73	**9**	**3.22**	**.97**	**9**	**2.00**	**1.41**
Design	9	3.33	1.32	10	3.00	1.33	9	3.78	.83	**10**	**2.30**	**1.06**	**10**	**2.10**	**.99**
Education	12	3.33	1.15	12	3.25	1.29	12	3.33	1.07	**12**	**1.83**	**.72**	**12**	**1.67**	**.49**
Engineering	38	3.21	.96	37	3.08	1.23	39	3.69	.89	**39**	**2.33**	**.93**	**39**	**2.36**	**1.16**
Fam. & Con. Sci.	15	3.07	1.28	15	3.40	1.24	15	3.40	1.12	**15**	**2.27**	**1.22**	**14**	**1.64**	**.50**
Lib. Arts & Sci.	89	3.16	1.12	87	3.10	1.16	89	3.54	.98	**90**	**2.36**	**.99**	**90**	**2.21**	**1.07**
Veterinary Med.	18	3.39	1.04	18	3.22	1.17	18	3.44	1.15	**18**	**2.33**	**1.14**	**18**	**1.83**	**.62**
F - Value		1.39			1.57			.35			**1.45**			**1.59**	
F - Prob.		.20			.14			.95			**.18**			**.13**	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.24. Mean Scores, Standard Deviations, and F-values for Items 21 through 25 on the TQIAS for Faculty by College of Appointment**

	Item 21[1]			Item 22			Item 23			Item 24			Item 25		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	**8**	**2.00**	**.53**	8	3.63	.52	8	4.13	.99	8	3.25	.71	**8**	**2.75**	**1.04**
Agriculture	**55**	**2.87[a]**	**1.09**	55	3.53	.77	55	3.91	.95	54	2.91	1.05	**55**	**2.93**	**.92**
Bus. Admin.	**9**	**2.78**	**.97**	9	3.11	.60	9	3.78	1.09	9	2.78	1.30	**9**	**3.22**	**.83**
Design	**10**	**1.70[b]**	**.67**	10	3.70	.67	10	3.70	.82	10	2.40	.84	**10**	**3.00**	**1.05**
Education	**12**	**2.58**	**1.08**	12	3.25	1.14	12	4.17	.58	12	2.83	1.11	**12**	**2.83**	**.94**
Engineering	**38**	**2.26**	**.92**	38	3.74	.76	39	4.08	.58	38	2.92	.94	**39**	**3.03**	**.93**
Fam. & Con. Sci.	**14**	**2.29**	**.99**	15	3.67	.90	15	3.87	1.19	15	3.33	1.23	**15**	**2.73**	**.80**
Lib. Arts & Sci.	**90**	**2.41**	**1.06**	89	3.60	.84	90	3.84	.73	87	2.93	1.09	**89**	**3.03**	**.79**
Veterinary Med.	**18**	**2.50**	**.99**	18	4.11	1.08	18	3.61	1.20	18	2.72	1.07	**18**	**2.78**	**.94**
F - Value		**2.44**			1.71			.83			.79			**.53**	
F - Prob.		**.01***			.10			.58			.61			**.84**	

[1]SNK's test: a is significantly different from b.

*Significant difference at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.25. Mean Scores, Standard Deviations, and F-values for Items 26 through 30 on the TQIAS for Faculty by College of Appointment**

	Item 26			Item 27[1]			Item 28			Item 29[2]			Item 30		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.38	.52	8	4.50[a]	.53	**8**	**1.38**	**.52**	**8**	**2.38**	**.92**	8	3.63	.92
Agriculture	55	4.38	.56	55	3.47[b]	.92	**55**	**2.07**	**.88**	**54**	**2.70[c]**	**1.22**	55	3.22	1.03
Bus. Admin.	9	4.56	.53	9	3.56	.73	**9**	**2.33**	**1.00**	**9**	**3.00**	**1.12**	9	3.00	1.12
Design	10	4.60	.52	9	3.56	1.13	**10**	**1.90**	**.57**	**10**	**2.50**	**.85**	9	3.56	1.13
Education	12	4.67	.49	12	3.42	.51	**12**	**2.00**	**.95**	**12**	**2.42**	**.79**	12	3.58	1.00
Engineering	39	4.38	.63	38	3.55	1.03	**39**	**2.15**	**.90**	**38**	**2.45**	**1.01**	39	3.13	1.06
Fam. & Con. Sci.	15	4.60	.51	15	3.93	.88	**15**	**1.80**	**1.01**	**15**	**2.07**	**1.10**	15	3.67	1.05
Lib. Arts & Sci.	89	4.37	.63	82	3.37[d]	.84	**90**	**1.90**	**.86**	**90**	**2.58[e]**	**.99**	89	2.92	1.12
Veterinary Med.	18	4.50	.51	18	3.56[f]	.86	**18**	**1.78**	**1.00**	**18**	**1.78[g]**	**.88**	18	3.56	.92
F - Value		.79			2.01			**1.20**			**2.04**			1.92	
F - Prob.		.61			.05*			**.30**			**.04***			.06	

[1]SNK's test: a is significantly different from d, b, and f.
[2]SNK's test: g is significantly different from c and e.
*Significant difference at .05 level.
**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.26. Mean Scores, Standard Deviations, and F-values for Items 31 through 33A on the TQIAS for Faculty by College of Appointment

	Item 31[1]			Item 32A			Item 32B			Item 32C[2]			Item 33A		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.63[a]	.52	8	4.25	.46	8	4.25	.46	8	4.38	.52	8	4.38	.52
Agriculture	55	3.42[b]	1.05	55	4.22	.69	55	4.27	.65	55	3.89	1.03	55	4.40	.53
Bus. Admin.	9	3.44	1.01	9	4.00	.87	9	4.11	.33	9	3.33	.87	9	4.00	.87
Design	10	3.60	1.17	10	4.20	.79	10	4.20	.79	10	3.60	1.26	10	4.40	.52
Education	12	4.33	.49	12	4.25	.45	11	4.36	.50	12	3.50	.80	12	4.08	.51
Engineering	39	3.46	1.00	37	4.24	.68	38	4.37	.63	38	3.74	1.01	38	4.37	.59
Fam. & Con. Sci.	15	3.93	1.03	15	4.27	.59	15	4.33	.49	15	4.20	.56	15	4.40	.51
Lib. Arts & Sci.	90	3.53[c]	1.04	88	4.25	.67	89	4.34	.56	87	4.01	.77	90	4.40	.54
Veterinary Med.	18	3.67	1.03	18	3.94	.73	18	4.17	.62	18	3.61	.85	18	4.33	.59
F - Value		2.43			.53			.41			1.95			.96	
F - Prob.		.02*			.83			.91			.05*			.47	

[1]SNK's test: a is significantly different from b and c.
[2]No difference between groups is indicated
*Significant difference at .05 level.

Table 4.27. Mean Scores, Standard Deviations, and F-values for Items 33B through 36 on the TQIAS for Faculty by College of Appointment**

	Item 33B			Item 33C			Item 34			Item 35			Item 36[1]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.38	.52	8	4.38	.52	8	2.88	.99	**8**	**2.13**	**.64**	**8**	**2.13**	**.83**
Agriculture	55	4.38	.56	55	4.33	.55	55	2.15	.95	**55**	**2.09**	**.80**	**55**	**2.73[a]**	**1.03**
Bus. Admin.	9	4.11	.33	9	4.00	.50	9	1.89	.60	**9**	**2.00**	**.87**	**9**	**3.67[b]**	**1.12**
Design	10	4.50	.53	10	4.20	.79	10	2.80	1.14	**10**	**2.20**	**.79**	**10**	**2.40**	**1.26**
Education	11	4.27	.47	12	4.33	.49	12	2.75	1.36	**12**	**2.00**	**1.28**	**12**	**1.75[c]**	**.97**
Engineering	39	4.49	.56	39	4.23	.63	38	2.55	1.16	**38**	**2.16**	**1.08**	**38**	**2.58[d]**	**1.22**
Fam. & Con. Sci.	15	4.33	.49	15	4.33	.49	15	2.47	.99	**15**	**1.80**	**.94**	**15**	**2.13[e]**	**1.30**
Lib. Arts & Sci.	89	4.43	.52	89	4.30	.57	89	2.37	.97	**88**	**2.26**	**1.03**	**90**	**2.54**	**1.01**
Veterinary Med.	18	4.39	.61	18	4.28	.57	17	2.35	1.17	**17**	**2.00**	**.71**	**18**	**2.61**	**1.38**
F - Value		.65			.45			1.40			**.54**			**2.58**	
F - Prob.		.73			.89			.20			**.83**			**.01***	

[1]SNK's test: b is significantly different from a, c, d, and e.

* Significant difference at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.28. Mean Scores, Standard Deviations, and F-values for Items 37 through 41 on the TQIAS for Faculty by College of Appointment**

	Item 37[1]			Item 38			Item 39			Item 40			Item 41		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	**8**	**2.38**	**.92**	**8**	**2.50**	**1.20**	8	3.63	1.06	8	3.13	.99	8	4.75	.46
Agriculture	**55**	**2.07**[a]	**.74**	**53**	**2.36**	**.81**	55	3.20	1.08	55	2.51	.92	55	4.09	.97
Bus. Admin.	**9**	**3.33**[b]	**1.00**	**9**	**2.00**	**.71**	9	3.00	.87	9	2.33	1.12	9	4.00	1.00
Design	**9**	**1.89**[c]	**.78**	**10**	**2.50**	**.85**	10	3.20	.63	10	2.60	.52	10	4.20	.63
Education	**12**	**1.92**[d]	**.79**	**12**	**2.00**	**1.04**	12	2.83	1.27	12	3.33	1.07	12	4.50	.52
Engineering	**39**	**2.41**[e]	**.91**	**38**	**2.24**	**1.10**	38	3.37	1.13	39	2.67	1.01	37	4.19	.78
Fam. & Con. Sci.	**15**	**1.93**[f]	**.80**	**15**	**2.73**	**1.10**	15	3.47	1.06	15	2.53	.99	15	4.60	.51
Lib. Arts & Sci.	**90**	**2.31**[g]	**.97**	**87**	**2.20**	**1.02**	87	3.43	1.00	89	2.84	.95	90	4.38	.76
Veterinary Med.	**18**	**1.94**[h]	**.73**	**18**	**2.50**	**.79**	18	3.22	1.26	18	2.44	.86	18	4.28	.96
F - Value		**3.17**			**.98**			.78			1.80			1.50	
F - Prob.		**.00***			**.45**			.62			.08			.16	

[1]SNK's test: b is significantly different from a, c, d, e, f, g, and h. Scheffe's test: b is significantly different from a.
*Significant difference at .05 level.
**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.29. Mean Scores, Standard Deviations, and F-values for Items 42 through 46 on the TQIAS for Faculty by College of Appointment**

	Item 42			Item 43			Item 44[1]			Item 45			Item 46		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.50	.76	**8**	**2.00**	**1.07**	8	3.75	.46	7	3.14	.90	7	3.00	.82
Agriculture	55	3.67	1.07	**55**	**1.80**	**.80**	55	3.11[a]	1.13	55	4.00	1.14	55	3.53	1.15
Bus. Admin.	9	3.78	1.09	**9**	**2.11**	**.78**	8	3.25	1.17	9	4.44	.53	8	3.50	1.20
Design	10	3.60	.97	**10**	**2.20**	**.92**	10	3.50	1.08	10	3.90	.74	9	3.67	.87
Education	12	4.00	.95	**12**	**2.33**	**1.37**	12	3.17	1.11	12	4.42	.79	12	3.50	1.24
Engineering	38	3.87	1.19	**39**	**2.08**	**.66**	39	3.77[b]	1.01	38	4.08	.91	39	3.54	1.07
Fam. & Con. Sci.	15	4.20	.94	**15**	**1.87**	**.83**	15	3.87	.99	15	4.40	.74	15	3.60	.99
Lib. Arts & Sci.	89	4.04	.88	**89**	**2.01**	**.96**	89	3.53	1.01	88	3.94	1.01	86	3.30	1.04
Veterinary Med.	18	3.83	.99	**18**	**1.83**	**.71**	18	3.78	.88	18	3.78	1.11	18	3.33	1.03
F - Value		1.08			**.79**			2.00			1.65			.53	
F - Prob.		.38			**.61**			.05*			.11			.83	

1SNK's test: a is significantly different from b.

*Significant difference at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.30. Mean Scores, Standard Deviations, and F-values for Items 47 through 51 on the TQIAS for Faculty by College of Appointment**

	Item 47			Item 48			Item 49			Item 50			Item 51		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.88	.99	8	2.88	.83	**8**	**2.88**	**.99**	8	4.50	.53	**8**	**2.00**	**.53**
Agriculture	55	3.55	1.17	54	2.56	1.14	**55**	**3.20**	**1.03**	55	3.98	1.10	**55**	**2.33**	**1.02**
Bus. Admin.	9	3.44	1.13	9	3.44	1.24	**9**	**3.11**	**1.17**	9	3.56	1.13	**9**	**2.56**	**.73**
Design	9	3.56	1.13	10	2.50	.71	**10**	**3.20**	**.63**	10	4.40	.52	**10**	**2.20**	**.79**
Education	12	3.92	1.00	12	2.92	1.24	**12**	**2.92**	**1.31**	12	3.67	1.50	**12**	**2.67**	**1.23**
Engineering	38	3.79	1.02	39	2.85	1.06	**38**	**2.87**	**1.14**	38	4.16	.92	**38**	**2.42**	**.83**
Fam. & Con. Sci.	15	4.27	.59	15	2.47	1.25	**15**	**3.07**	**1.10**	15	4.47	.83	**15**	**1.93**	**1.10**
Lib. Arts & Sci.	88	3.67	1.11	89	2.91	.98	**88**	**2.95**	**.88**	88	3.99	.99	**87**	**2.33**	**1.02**
Veterinary Med.	18	3.39	1.33	18	2.78	1.17	**18**	**2.83**	**1.20**	18	4.22	1.00	**18**	**2.17**	**.71**
F - Value		1.01			1.19			**.52**			1.35			**.81**	
F - Prob.		.43			.31			**.84**			.22			**.60**	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.31. Mean Scores, Standard Deviations, and F-values for Items 53A through 55 on the TQIAS for Faculty by College of Appointment

	Item 52A			Item 52B			Item 53			Item 54[1]			Item 55		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.63	.74	8	2.50	.76	8	4.13	.83	8	4.38	.74	**8**	**3.63**	**.92**
Agriculture	55	3.31	1.05	55	3.13	1.04	54	4.04	.87	55	4.25	.55	**55**	**3.33**	**1.19**
Bus. Admin.	9	3.67	.87	9	3.44	1.01	9	4.22	.44	9	4.11	.33	**9**	**2.89**	**1.36**
Design	10	3.60	.70	10	3.30	.95	10	4.50	.53	10	4.10	.88	**10**	**3.30**	**1.16**
Education	12	3.58	1.24	12	3.00	1.04	12	4.08	.29	12	4.42	.67	**12**	**3.33**	**1.30**
Engineering	37	3.51	.93	37	3.16	1.09	38	4.24	.59	38	3.95[a]	.61	**38**	**3.39**	**1.18**
Fam. & Con. Sci.	15	3.80	.77	15	3.27	.96	15	4.47	.52	15	4.40	.74	**15**	**3.33**	**1.05**
Lib. Arts & Sci.	87	3.66	.91	83	3.28	.93	89	4.13	.81	89	4.30[b]	.68	**89**	**3.54**	**1.03**
Veterinary Med.	18	3.56	1.15	18	3.33	1.19	18	4.44	.78	18	4.56[c]	.51	**18**	**3.39**	**1.14**
F - Value		.72			.77			1.14			2.03			**.49**	
F - Prob.		.67			.63			.34			.04*			**.86**	

[1]SNK's test: a is significantly different from b and c.

*Significant difference at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

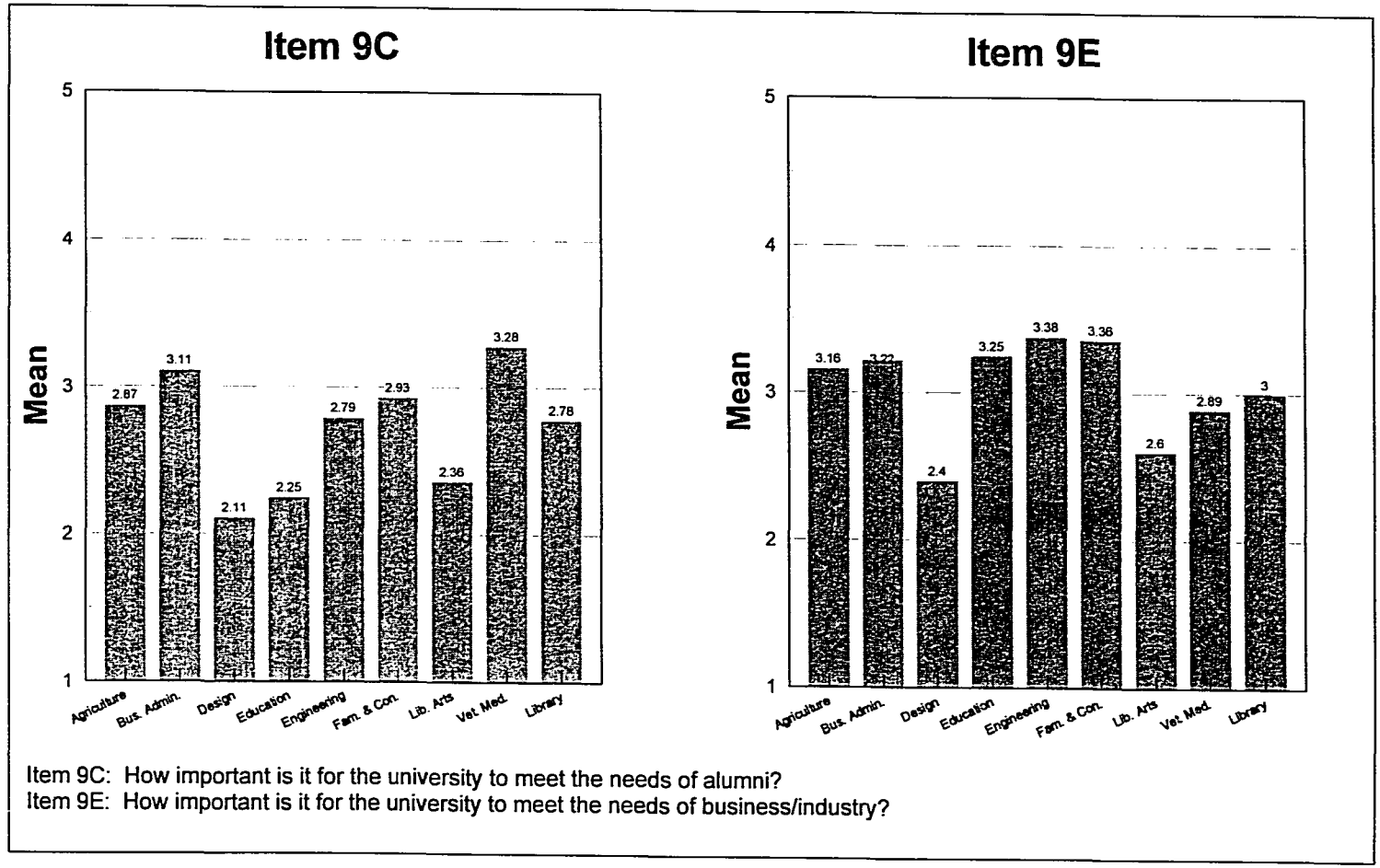
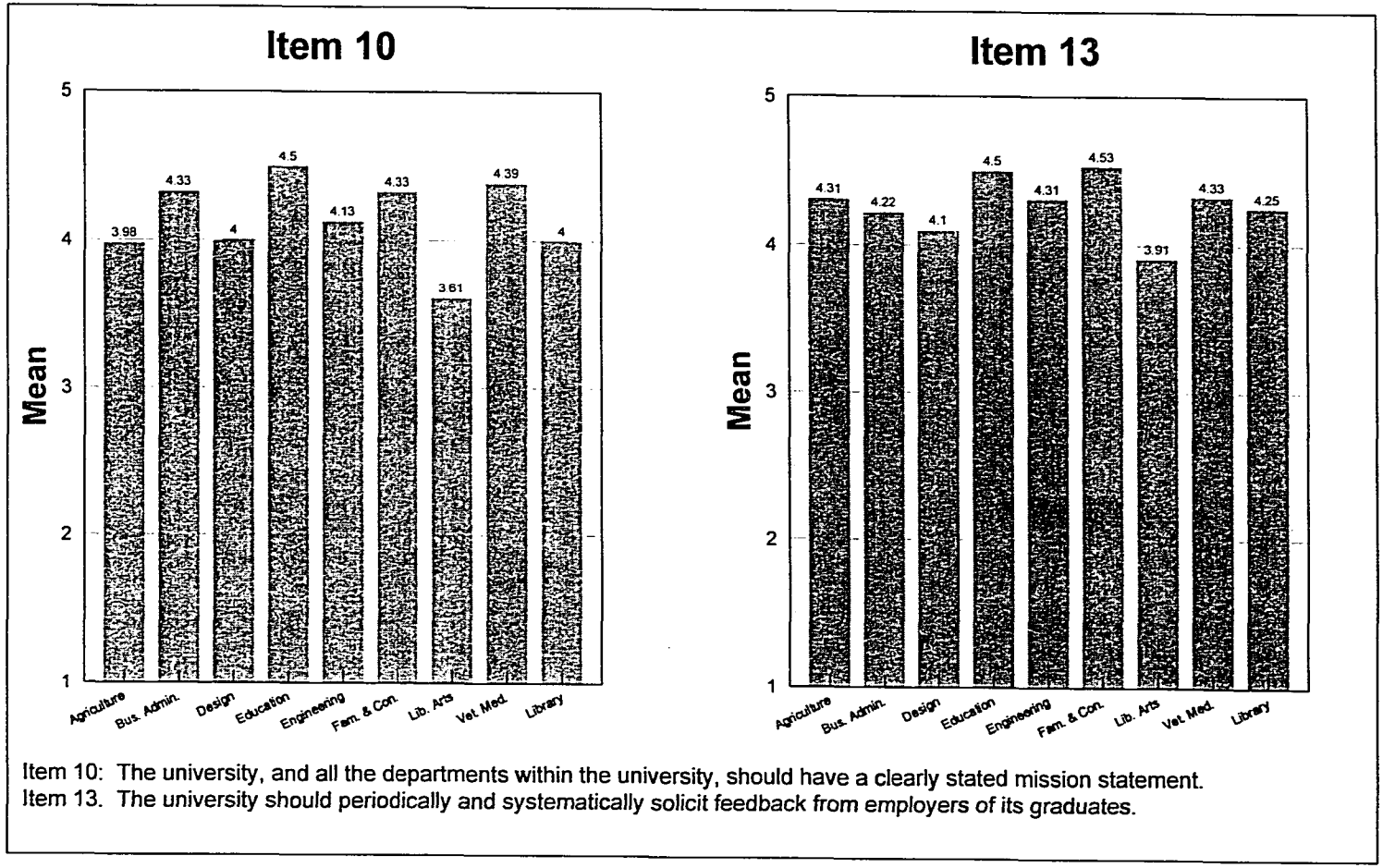
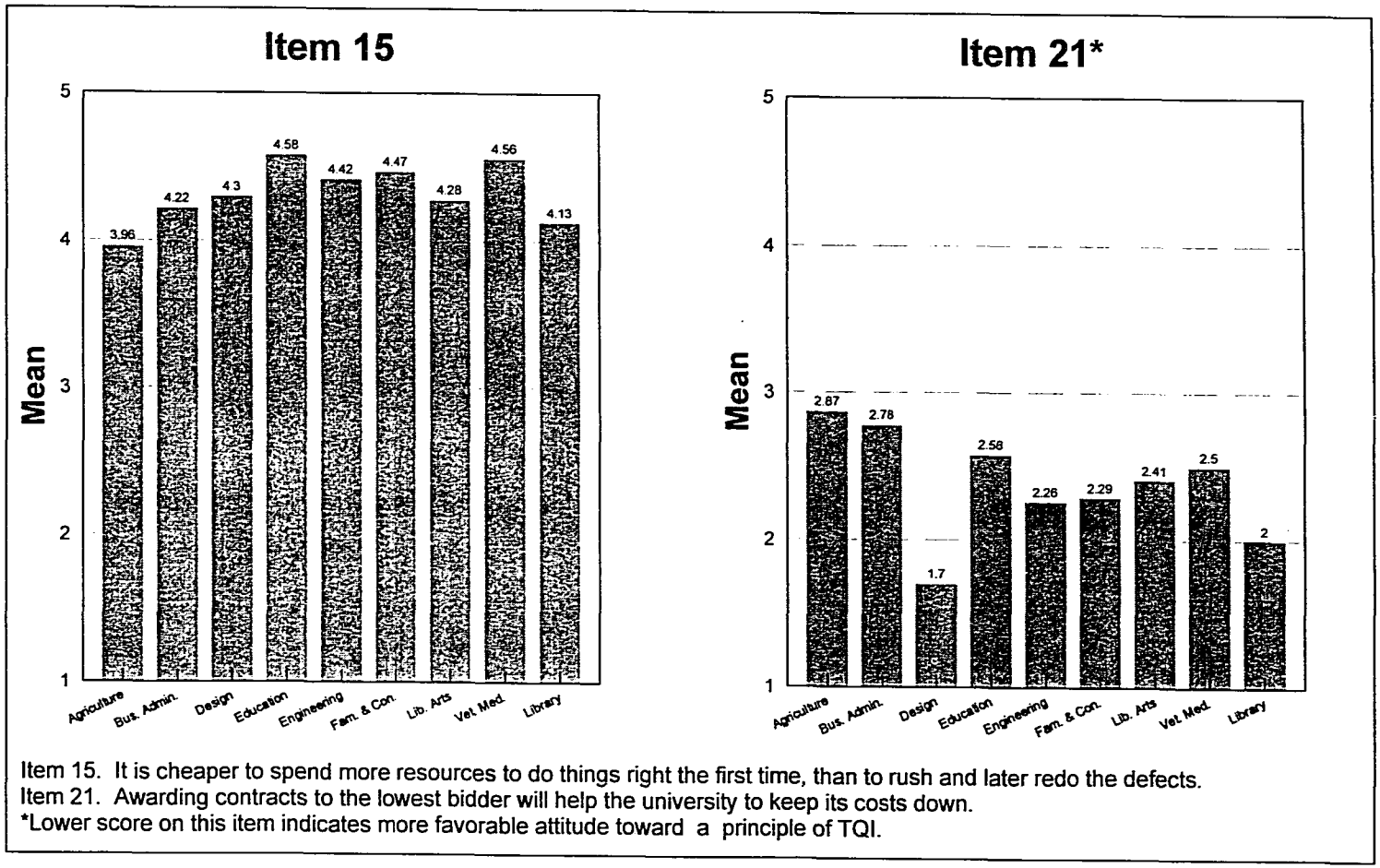


Figure 4.9. Bar Diagrams Showing the Comparison of Faculty Across College on Items 9C and 9E for Which Significant Differences Were Indicated.



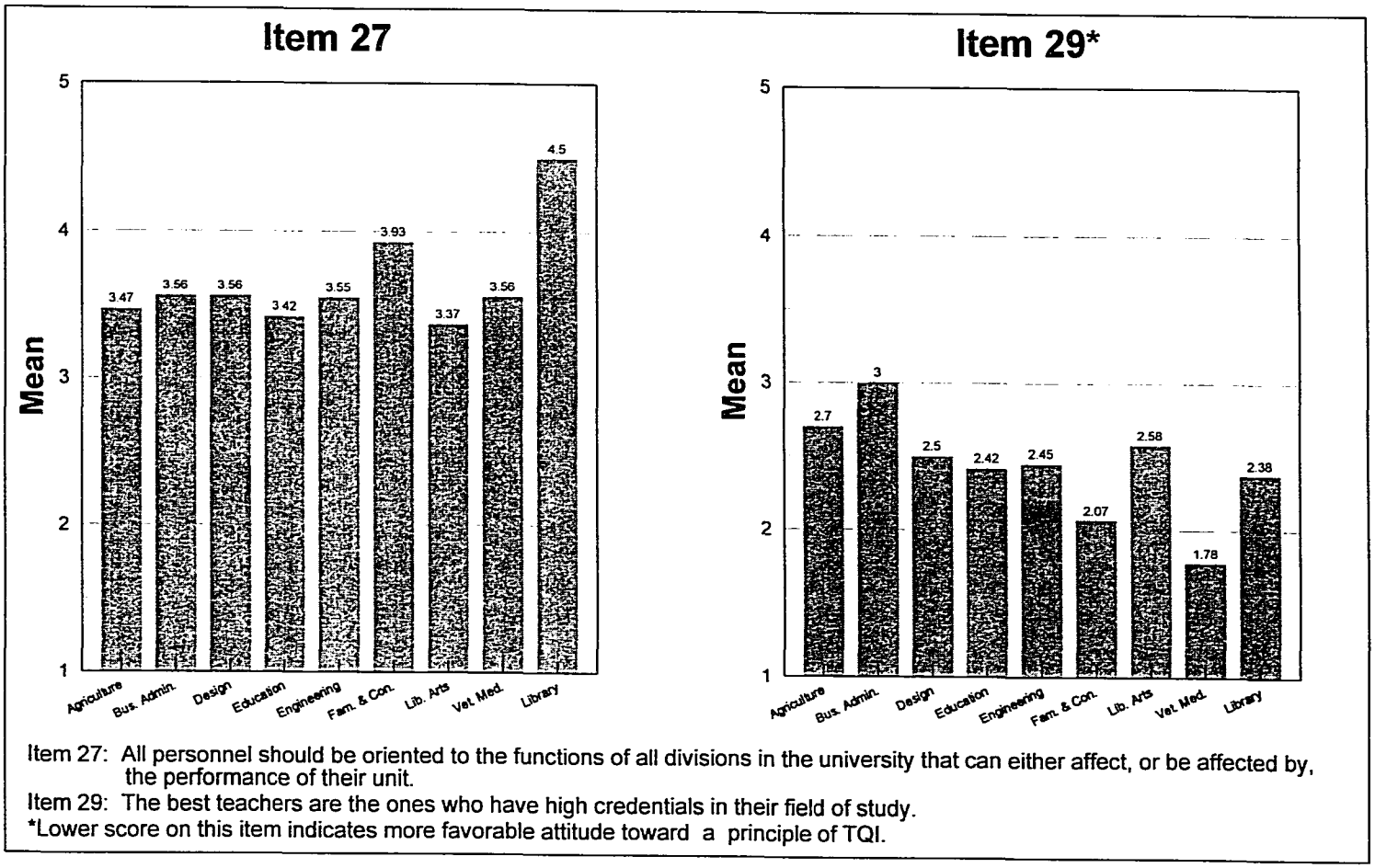
Item 10: The university, and all the departments within the university, should have a clearly stated mission statement.
Item 13. The university should periodically and systematically solicit feedback from employers of its graduates.

Figure 4.10. Bar Diagrams Showing the Comparison of Faculty Across College on Items 10 and 13 for Which Significant Differences Were Indicated.



Item 15. It is cheaper to spend more resources to do things right the first time, than to rush and later redo the defects.
Item 21. Awarding contracts to the lowest bidder will help the university to keep its costs down.
*Lower score on this item indicates more favorable attitude toward a principle of TQI.

Figure 4.11. Bar Diagrams Showing the Comparison of Faculty Across College on Items 15 and 21 for Which Significant Differences Were Indicated.

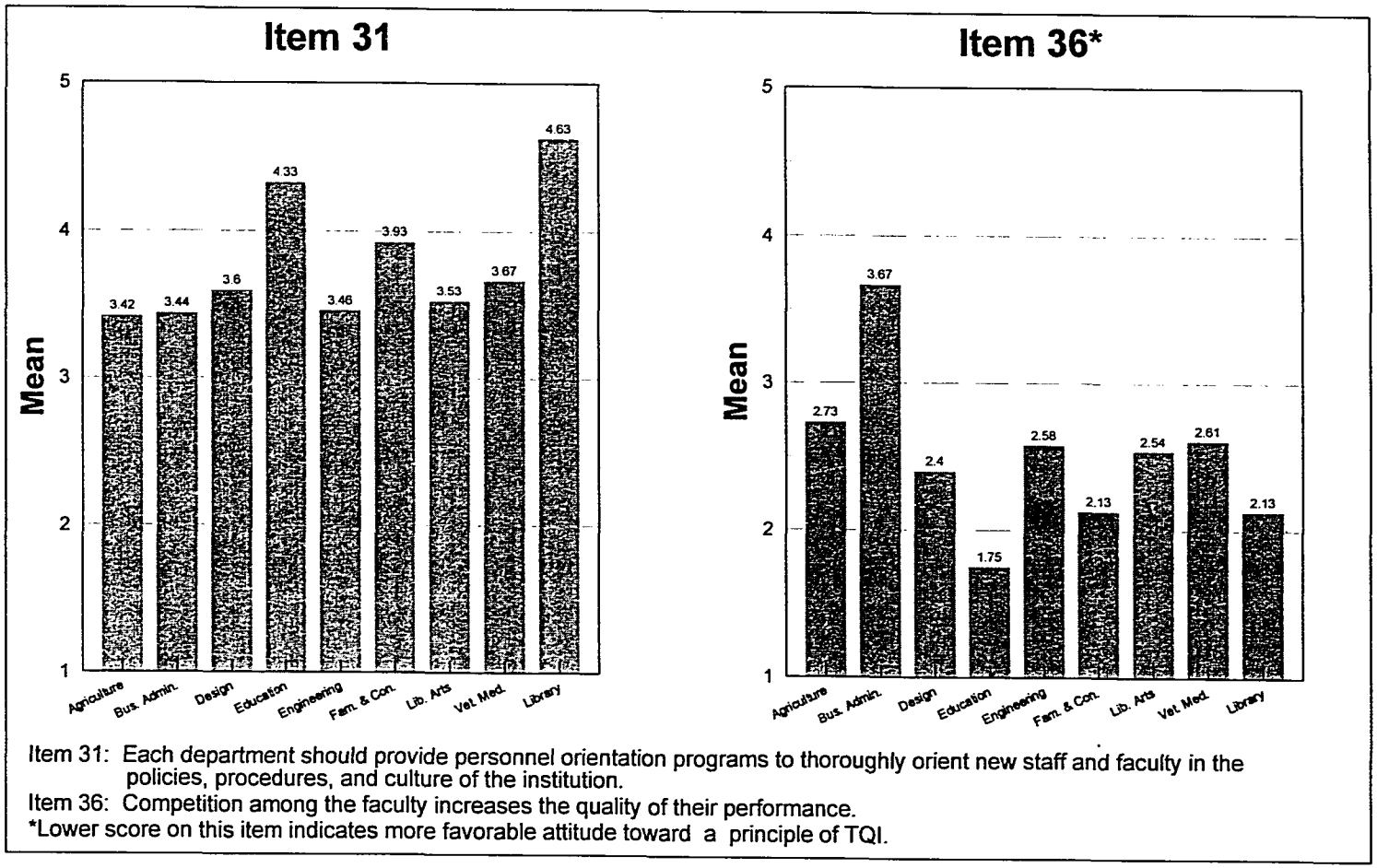


Item 27: All personnel should be oriented to the functions of all divisions in the university that can either affect, or be affected by, the performance of their unit.

Item 29: The best teachers are the ones who have high credentials in their field of study.

*Lower score on this item indicates more favorable attitude toward a principle of TQI.

Figure 4.12. Bar Diagrams Depicting the Comparison of Faculty Across College on Items 27 and 29 for Which Significant Differences Were Indicated.



Item 31: Each department should provide personnel orientation programs to thoroughly orient new staff and faculty in the policies, procedures, and culture of the institution.
Item 36: Competition among the faculty increases the quality of their performance.
*Lower score on this item indicates more favorable attitude toward a principle of TQI.

Figure 4.13. Bar Diagrams Depicting the Comparison of Faculty Across College on Items 31 and 36 for Which Significant Differences Were Indicated.

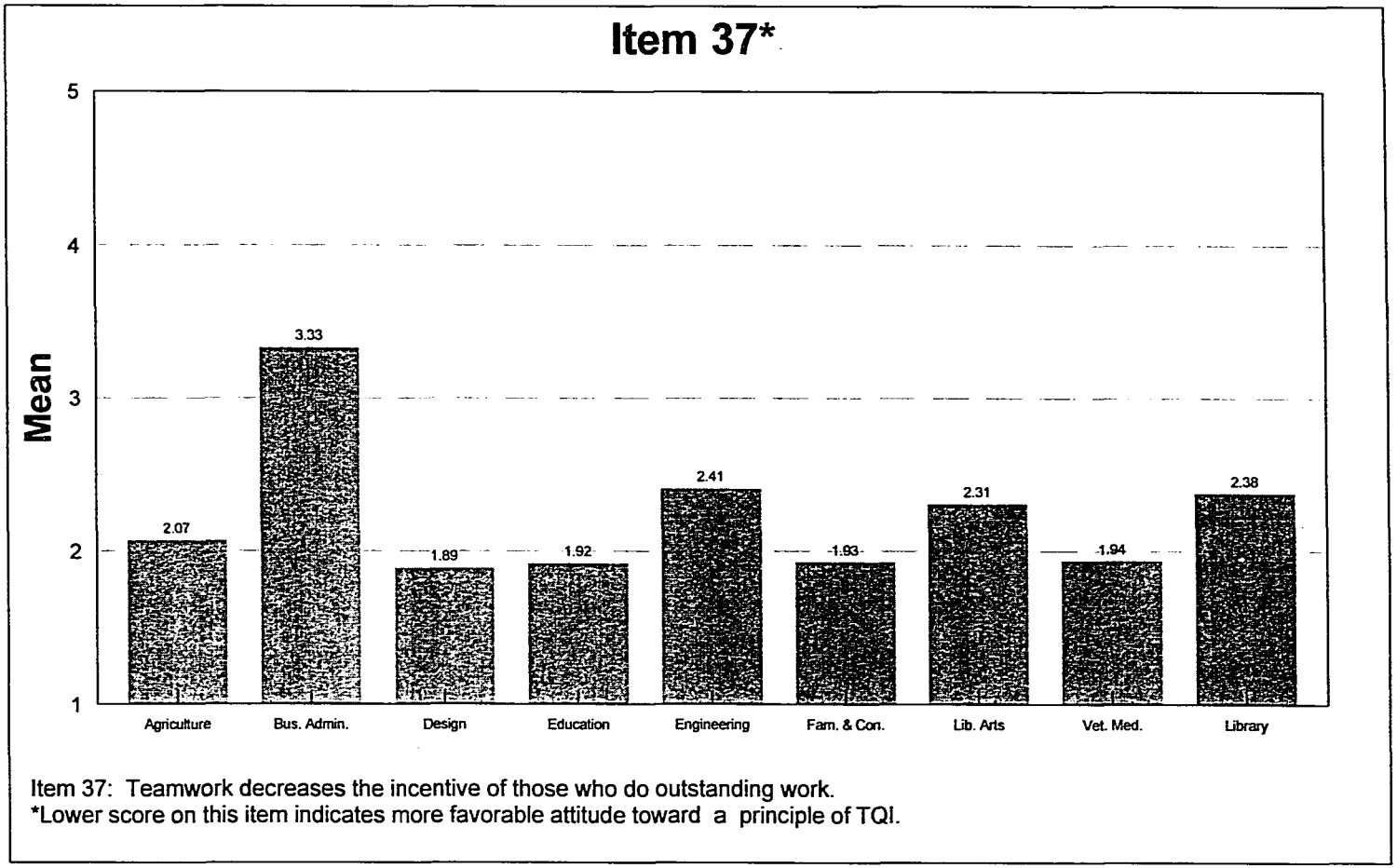
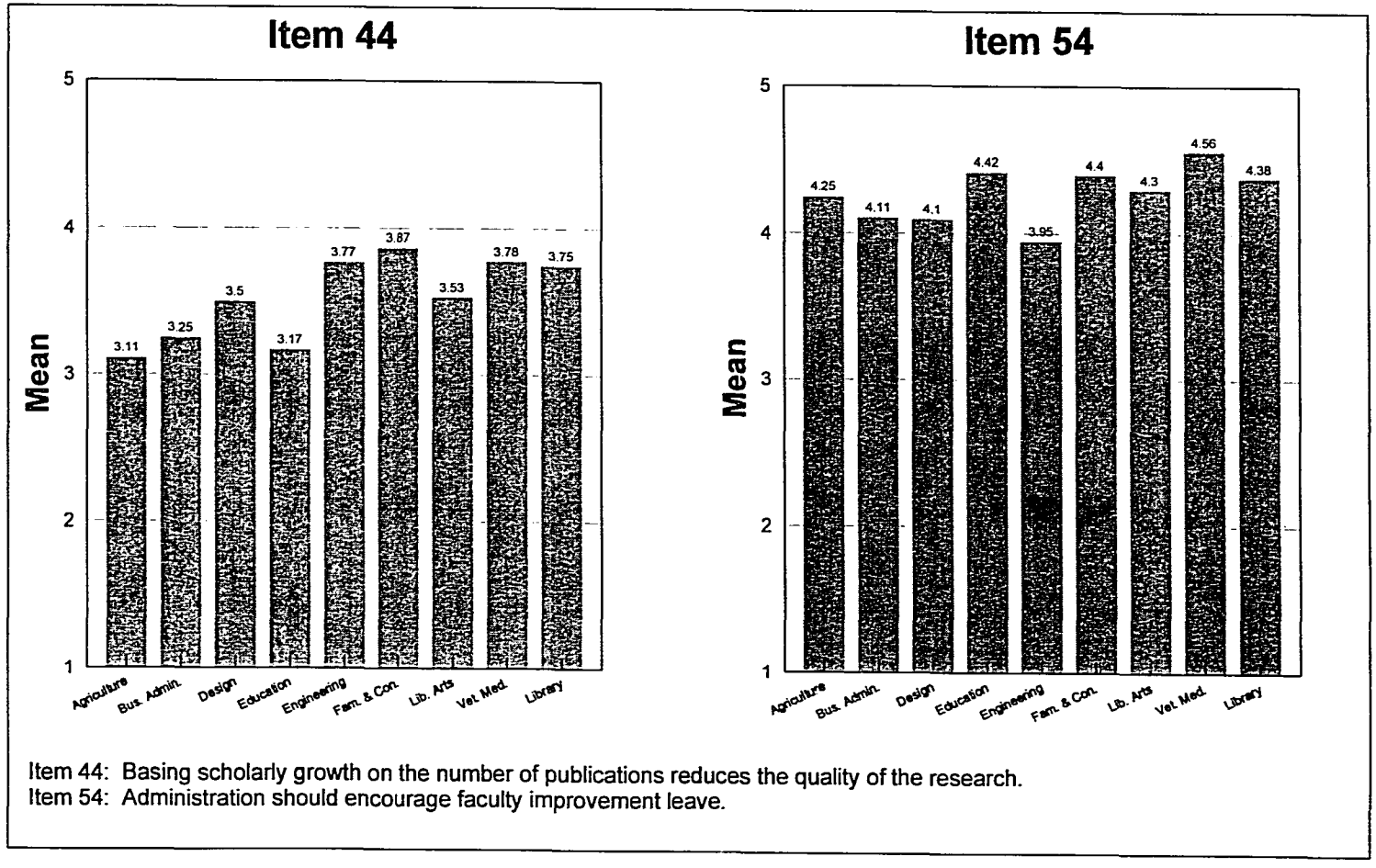


Figure 4.14. Bar Diagrams Depicting the Comparison of Faculty Across College on Item 37 for Which Significant Differences Were Indicated.



Item 44: Basing scholarly growth on the number of publications reduces the quality of the research.
Item 54: Administration should encourage faculty improvement leave.

Figure 4.15. Bar Diagrams Depicting the Comparison of Faculty Across College on Items 44 and 54 for Which Significant Differences Were Indicated.

Table 4.32. Mean Scores, Standard Deviations, and F-values for Items 9A through 9E on the TQIAS for Faculty by Age

	Student			Parent[1]			Alumni			Employer			Bus/Ind.		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	4.88	.35	7	2.14	1.07	8	2.63	.92	8	4.00	.93	8	3.75	1.04
31 - 35	13	4.69	.48	13	2.54	.78	13	2.54	.78	13	3.62	.87	12	3.33	.49
36 - 40	36	4.69	.52	36	2.64	.90	36	2.51	.85	35	3.31	.87	36	2.89	1.01
41 - 45	39	4.69	.61	39	2.72	1.05	39	2.51	.85	39	3.26	.99	39	2.79	.83
46 - 50	43	4.67	.71	42	3.02	.95	43	2.74	1.05	43	3.21	1.21	43	2.91	1.02
51 - 55	35	4.69	.80	35	3.14	.91	35	2.74	.92	35	3.23	1.09	35	2.97	.89
56 and over	85	4.79	.44	84	2.94	.97	83	2.70	.97	85	3.42	.92	84	3.02	.99
F - Value		.37			2.17			.32			1.09			1.53	
F - Prob.		.90			.05*			.93			.37			.57	

[1]No significant differences were indicated.
*Significant difference at .05 level.

Table 4.33. Mean Scores, Standard Deviations, and F-values for Items 9F through 10 on the TQIAS for Faculty by Age

	State/Local Gov.			Fed. Gov.			Faculty			Other Offices			Item 10		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	3.00	.76	8	3.00	.76	8	4.50	.53	7	3.29	1.38	8	3.88	1.25
31 - 35	13	2.69	.85	13	2.54	.88	13	4.31	.75	13	2.54	1.20	13	3.62	.87
36 - 40	36	2.58	.73	36	2.36	.68	36	4.00	.93	35	2.51	.95	36	4.14	.87
41 - 45	39	2.79	.95	39	2.46	.88	39	3.92	.93	36	2.86	1.17	40	4.05	.99
46 - 50	43	2.60	.95	43	2.40	.85	43	4.21	.89	39	2.72	.97	43	4.16	1.00
51 - 55	35	2.80	1.05	35	2.49	.92	35	4.03	.98	32	2.72	.99	36	3.94	1.01
56 and over	83	2.83	1.02	84	2.62	.99	84	4.18	.82	76	2.66	.93	85	3.82	.90
F - Value		.58			.92			.98			.81			1.18	
F - Prob.		.75			.48			.44			.56			.32	

Table 4.34. Mean Scores, Standard Deviations, and F-values for Items 11 through 15 on the TQIAS for Faculty by Age**

	Item 11			Item 12			Item 13			Item 14			Item 15		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	2.75	1.39	8	4.00	.76	8	4.25	.46	**7**	**4.43**	**.53**	7	4.14	.90
31 - 35	13	2.46	1.13	13	3.23	1.17	13	4.15	.38	**13**	**4.15**	**.90**	13	4.54	.66
36 - 40	36	2.78	1.24	36	3.50	.97	36	4.25	.69	**36**	**4.11**	**.89**	36	4.42	.60
41 - 45	40	2.65	1.39	40	3.35	.92	40	4.33	.62	**40**	**4.23**	**.97**	40	4.25	.59
46 - 50	43	2.98	1.30	43	3.56	.98	43	4.09	.89	**43**	**4.14**	**.99**	43	4.28	.85
51 - 55	36	2.39	1.15	36	3.50	1.03	36	4.14	.68	**36**	**4.28**	**.74**	36	4.08	1.00
56 and over	84	2.69	1.16	84	3.48	.94	85	4.15	.68	**85**	**4.27**	**.75**	85	4.26	.71
F - Value		.85			.70			.52			**.32**			.91	
F - Prob.		.53			.65			.80			**.92**			.49	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.35. Mean Scores, Standard Deviations, and F-values for Items 16 through 20 on the TQIAS for Faculty by Age**

	Item 16			Item 17			Item 18			Item 19			Item 20		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	6	2.83	.75	8	2.38	1.19	8	3.63	1.19	**8**	**2.38**	**1.06**	**8**	**2.25**	**1.39**
31 - 35	13	3.23	1.17	12	2.83	1.47	13	3.46	1.13	**13**	**2.15**	**.90**	**12**	**2.00**	**1.28**
36 - 40	36	3.14	1.15	36	3.06	1.29	36	3.56	1.03	**36**	**2.36**	**1.10**	**36**	**1.92**	**.91**
41 - 45	39	2.95	1.15	39	3.18	1.14	40	3.55	.88	**40**	**2.25**	**.90**	**40**	**2.10**	**.98**
46 - 50	42	3.12	1.15	42	3.07	1.24	42	3.38	1.03	**43**	**2.28**	**1.18**	**43**	**2.19**	**1.18**
51 - 55	36	2.92	1.23	36	2.81	1.14	35	3.46	1.04	**36**	**2.33**	**1.12**	**36**	**1.89**	**.89**
56 and over	85	3.19	1.06	83	3.05	1.15	84	3.60	1.00	**84**	**2.50**	**.94**	**83**	**2.13**	**.95**
F - Value		.45			.76			.27			**.47**			**.53**	
F - Prob.		.84			.60			.95			**.83**			**.78**	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.36. Mean Scores, Standard Deviations, and F-values for Items 21 through 25 on the TQIAS for Faculty by Age**

	Item 21			Item 22			Item 23			Item 24			Item 25		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	**7**	**3.14**	**1.22**	7	3.43	1.27	8	3.75	1.04	7	2.57	.53	**8**	**2.88**	**1.13**
31 - 35	**13**	**2.08**	**.95**	13	3.85	1.07	13	3.31	.85	13	3.08	.95	**13**	**3.15**	**.69**
36 - 40	**36**	**2.33**	**1.15**	36	3.86	.64	36	3.86	.83	36	3.11	1.17	**36**	**2.75**	**.91**
41 - 45	**40**	**2.53**	**.99**	39	3.64	.84	40	3.83	.90	38	3.00	1.21	**40**	**2.88**	**.79**
46 - 50	**43**	**2.49**	**1.06**	43	3.56	.77	43	3.95	.82	43	2.72	.91	**43**	**2.91**	**.87**
51 - 55	**36**	**2.64**	**1.07**	36	3.50	1.00	36	4.17	.81	36	2.83	1.16	**36**	**3.14**	**.90**
56 and over	**84**	**2.44**	**1.01**	85	3.58	.79	85	3.91	.80	83	2.89	1.00	**84**	**3.01**	**.88**
F - Value		**1.08**			.92			1.85			.70			**.86**	
F - Prob.		**.38**			.48			.09			.65			**.53**	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.37. Mean Scores, Standard Deviations, and F-values for Items 26 through 30 on the TQIAS for Faculty by Age**

	Item 26			Item 27			Item 28			Item 29			Item 30		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	4.50	.53	8	3.38	.92	**8**	**1.38**	**.52**	**8**	**2.38**	**1.06**	8	3.38	1.41
31 - 35	13	4.46	.52	12	3.75	.97	**13**	**1.77**	**1.01**	**13**	**2.38**	**.96**	13	3.62	1.04
36 - 40	36	4.50	.51	36	3.31	.92	**36**	**1.97**	**.84**	**36**	**2.28**	**.91**	36	3.19	.95
41 - 45	40	4.45	.50	39	3.67	1.01	**40**	**1.90**	**.87**	**40**	**2.45**	**1.01**	40	3.55	1.06
46 - 50	43	4.53	.67	39	3.51	.94	**43**	**1.79**	**.86**	**42**	**2.33**	**.93**	42	3.24	1.14
51 - 55	36	4.33	.68	33	3.48	.87	**36**	**2.06**	**.92**	**35**	**2.46**	**1.17**	36	3.00	1.07
56 and over	84	4.37	.58	84	3.54	.81	**85**	**2.09**	**.89**	**85**	**2.74**	**1.16**	84	2.95	1.05
F - Value		.26			.69			**1.38**			**1.24**			2.03	
F - Prob.		.68			.66			**.22**			**.29**			.06	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.38. Mean Scores, Standard Deviations, and F-values for Items 31 through 33A on the TQIAS for Faculty by Age

	Item 31			Item 32A			Item 32B			Item 32C			Item 33A		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	3.63	1.51	7	4.57	.53	8	4.63	.52	8	4.13	.64	7	4.43	.53
31 - 35	13	4.00	1.08	13	4.31	.85	13	4.46	.52	13	4.15	1.14	13	4.54	.66
36 - 40	36	3.39	.99	36	4.25	.69	36	4.42	.65	36	3.83	.88	36	4.44	.56
41 - 45	40	3.68	1.10	39	4.28	.65	40	4.35	.62	39	3.74	.97	40	4.45	.50
46 - 50	43	3.72	1.03	43	4.21	.64	42	4.26	.54	43	4.05	.82	43	4.33	.61
51 - 55	36	3.83	.94	36	4.11	.67	36	4.25	.55	36	3.86	.80	36	4.33	.53
56 and over	85	3.45	.99	83	4.18	.67	83	4.23	.59	82	3.82	.93	85	4.29	.55
F - Value		1.33			.63			1.13			.78			.78	
F - Prob.		.24			.70			.35			.58			.58	

Table 4.39. Mean Scores, Standard Deviations, and F-values for Items 33B through 36 on the TQIAS for Faculty by Age**

	Item 33B			Item 33C			Item 34			Item 35			Item 36		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	4.50	.53	8	4.38	.74	7	2.86	1.35	**8**	**1.63**	**.74**	**7**	**2.43**	**.98**
31 - 35	13	5.62	.51	13	4.54	.52	13	1.92	.64	**13**	**2.08**	**.49**	**13**	**2.31**	**.85**
36 - 40	36	4.47	.65	36	4.31	.58	36	2.25	.91	**36**	**2.08**	**.87**	**36**	**2.61**	**1.15**
41 - 45	40	4.48	.51	40	4.33	.62	40	2.65	1.12	**40**	**2.00**	**.99**	**40**	**2.55**	**1.20**
46 - 50	42	4.38	.49	43	4.40	.49	42	2.29	.99	**43**	**2.02**	**.91**	**43**	**2.70**	**1.08**
51 - 55	36	4.36	.49	36	4.17	.56	36	2.22	1.05	**35**	**2.17**	**.92**	**36**	**2.72**	**1.21**
56 and over	84	4.33	.52	84	4.23	.57	84	2.48	1.07	**82**	**2.33**	**1.04**	**85**	**2.47**	**1.13**
F - Value		.91			1.18			1.54			**1.24**			**.45**	
F - Prob.		.49			.32			.16			**.29**			**.84**	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.40. Mean Scores, Standard Deviations, and F-values for Items 37 through 41 on the TQIAS for Faculty by Age**

	Item 37			Item 38			Item 39			Item 40			Item 41		
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD
30 or less	**8**	**2.25**	**1.28**	**7**	**2.43**	**.98**	7	3.29		7	2.57	1.13	7	4.14	.69
31 - 35	**13**	**2.31**	**.85**	**13**	**2.77**	**1.09**	13	3.85		13	2.62	1.04	13	4.38	.87
36 - 40	**36**	**2.33**	**.83**	**36**	**2.17**	**1.03**	36	3.11		36	2.61	.96	36	4.28	.88
41 - 45	**40**	**2.23**	**.95**	**38**	**2.13**	**.81**	39	3.10		40	2.73	1.09	40	4.33	.76
46 - 50	**42**	**2.33**	**.98**	**41**	**2.46**	**.92**	41	3.10		43	2.77	1.02	42	4.40	.77
51 - 55	**36**	**2.00**	**.79**	**35**	**2.09**	**.89**	36	3.56		36	2.50	.85	36	4.33	.99
56 and over	**85**	**2.25**	**.91**	**85**	**2.35**	**1.03**	84	3.36		85	2.81	.89	85	4.15	.82
F - Value		**.57**			**1.36**			1.66			.58			.59	
F - Prob.		**.76**			**.23**			.13			.75			.74	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.41. Mean Scores, Standard Deviations, and F-values for Items 42 through 46 on the TQIAS for Faculty by Age**

	Item 42			Item 43			Item 44			Item 45			Item 46		
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD
30 or less	8	3.13	1.46	**8**	**1.75**	**.46**	8	4.00	.76	6	3.33	1.63	7	3.71	1.38
31 - 35	12	4.17	.94	**13**	**1.92**	**.76**	13	3.46	1.20	13	3.92	1.12	13	3.77	1.01
36 - 40	36	3.56	1.03	**36**	**2.06**	**.95**	36	3.56	1.30	36	3.83	.85	36	3.19	1.01
41 - 45	40	3.90	.98	**40**	**2.08**	**.89**	40	3.30	1.04	40	3.90	1.06	40	3.58	.98
46 - 50	43	4.00	.93	**42**	**2.17**	**.91**	42	3.33	1.03	43	4.00	.85	41	3.41	1.00
51 - 55	36	4.11	.92	**36**	**1.92**	**.91**	36	3.44	1.18	36	4.00	.99	36	3.33	1.15
56 and over	84	3.85	1.01	**85**	**1.88**	**.86**	84	3.61	.92	83	4.16	1.08	81	3.49	1.12
F - Value		2.01			**.74**			.88			1.00			.80	
F - Prob.		.06			**.62**			.51			.42			.57	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.42. Mean Scores, Standard Deviations, and F-values for Items 47 through 51 on the TQIAS for Faculty by Age**

	Item 47			Item 48			Item 49			Item 50			Item 51		
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD
30 or less	6	3.33		8	3.25	1.49	**7**	**3.14**	**1.22**	7	4.29	.95	6	2.67	1.63
31 - 35	13	3.23		13	2.85	.99	**13**	**3.08**	**.95**	13	3.46	.97	13	2.15	.69
36 - 40	36	3.64		35	2.77	1.03	**35**	**3.26**	**.98**	35	3.97	1.07	35	2.46	.92
41 - 45	40	3.85		40	2.95	1.18	**40**	**2.78**	**1.07**	40	3.98	1.12	40	2.08	.83
46 - 50	41	3.90		43	2.72	.98	**43**	**3.21**	**1.01**	43	4.23	.84	42	2.48	1.04
51 - 55	36	3.44		36	2.44	1.00	**36**	**3.03**	**1.03**	36	4.14	.99	36	2.19	.89
56 and over	85	3.72		84	2.82	1.08	**84**	**2.89**	**.96**	84	4.05	1.09	85	2.39	.98
F - Value		1.21			1.06			**1.22**			1.11			1.12	
F - Prob.		.30			.38			**.30**			.36			.35	

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.43. Mean Scores, Standard Deviations, and F-values for Items 52A through 55 on the TQIAS for Faculty by Age**

	Item 52A			Item 52B			Item 53			Item 54[1]			Item 55		
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD
30 or less	7	3.29	1.38	7	3.14	1.22	7	3.71	1.38	7	3.86	.90	**7**	**3.29**	**.76**
31 - 35	13	3.62	.77	13	3.08	.86	13	4.15	.69	13	4.38	.65	**13**	**3.69**	**1.03**
36 - 40	35	3.40	1.03	35	2.97	1.07	35	4.06	.64	35	3.91[a]	.61	**35**	**3.66**	**1.03**
41 - 45	40	3.83	.78	40	3.30	1.04	39	4.44	.68	40	4.43[b]	.59	**40**	**3.25**	**1.15**
46 - 50	40	3.50	.93	38	3.34	1.02	43	4.23	.72	43	4.37[c]	.72	**43**	**3.19**	**1.05**
51 - 55	36	3.39	1.18	35	3.20	1.11	36	4.31	.79	36	4.33[d]	.68	**36**	**3.39**	**1.29**
56 and over	84	3.57	.92	83	3.18	.94	85	4.11	.74	85	4.24[e]	.59	**85**	**3.42**	**1.12**
F - Value		.97			.52			1.74			2.99			**.86**	
F - Prob.		.45			.79			.11			.01*			**.52**	

[1]SNK's test: a is significantly different from b, c, d, and e.

*Significant difference at $\alpha = .05$ level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Null Hypothesis VI: There are no significant differences in the mean responses between tenured and non-tenured faculty on items 9 through 55 of the TQIAS.

T-tests were used to test for differences between the mean responses of faculty with tenure and those without tenure on each of the 47 attitude items. The results are presented in Table 4.44.

Significant differences were found between the two groups at the .05 level of significance. Significant differences between tenured and non-tenured respondents were indicated with regard to items 9B, 19, 30, 32A, 32B, 33A, 35, 40, 41, and 55. Figure 4.16 graphically depicts the means and the items for some of the significant differences that occured between tenured and nontenured faculty. Thus, the hypothesis of no significant difference between the groups is rejected for these items.

Null Hypothesis VII There are no significant differences in the mean responses among faculty according to their years as a faculty member in a higher education institution on items 9 through 55 of the TQIAS.

Several differences were indicated among respondents according to their length of time as a faculty member. The three groups, (10 years or less, 11-20 years, and over 20 years) were compared using ANOVA. Both SNK and Scheffe procedures were employed at the .05 level to reveal between what groups the differences existed. The results are shown in Table 4.45. Most of the differences occurred between the respondents that had been faculty members for 10 years or less and the other two groups. Significant differences were indicated on items 9B, 23, 30, 43, 45, 50, and 54. Figure 4.17 graphically depicts the means and the items for some of the significant differences that occured. The null hypothesis of no significant difference is rejected for these items.

Table 4.44. Mean Scores, Standard Deviations, and T-values for Items 9 through 55 on the TQIAS for Faculty by Tenure**

	Tenured			Not Tenured				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 9								
Student	210	4.74	.58	49	4.67	.59	.70	.49
Parents	209	2.99	.97	47	2.30	.75	4.59	.00*
Alumni	208	2.69	.94	49	2.59	.91	.67	.50
Employers	209	3.33	.98	49	3.41	1.08	-.46	.65
Sta/Loc. Gov.	208	2.77	.97	49	2.65	.88	.77	.44
Bus./Ind.	209	2.97	.94	48	3.04	1.01	-.49	.62
Fed. Gov.	209	2.50	.91	49	2.55	.82	-.34	.73
Faculty	209	4.10	.90	49	4.20	.76	-.78	.44
Other Offices	194	2.69	1.00	44	2.73	1.11	-.22	.83
Item 10	212	3.97	.93	49	3.96	1.06	.05	.96
Item 11	211	2.69	1.23	49	2.71	1.26	-.14	.89
Item 12	211	3.46	.96	49	3.55	.98	-.57	.57
Item 13	212	4.16	.71	49	4.31	.62	-1.37	.17
Item 14	**212**	**4.24**	**.86**	**48**	**4.13**	**.79**	**.86**	**.39**
Item 15	212	4.24	.77	48	4.42	.68	-1.50	.13
Item 16	210	3.03	1.14	47	3.34	1.01	-1.71	.09
Item 17	208	3.01	1.17	48	2.98	1.33	.18	.85
Item 18	209	3.48	1.00	49	3.69	1.00	-1.33	.18
Item 19	**211**	**2.43**	**1.04**	**49**	**2.08**	**.89**	**2.14**	**.03***
Item 20	**210**	**2.05**	**.97**	**48**	**2.15**	**1.17**	**-.58**	**.56**
Item 21	**211**	**2.49**	**1.04**	**48**	**2.40**	**1.07**	**.58**	**.56**
Item 22	212	3.59	.82	47	3.77	.91	-1.31	.19
Item 23	212	3.94	.83	49	3.71	.87	1.69	.09
Item 24	208	2.88	1.04	48	2.98	1.10	-.56	.58
Item 25	**211**	**2.97**	**.89**	**49**	**2.92**	**.81**	**.35**	**.73**
Item 26	211	4.40	.60	49	4.57	.50	-1.89	.06
Item 27	204	3.53	.90	47	3.47	.91	.42	.67
Item 28	**212**	**1.99**	**.88**	**49**	**1.80**	**.89**	**1.39**	**.17**
Item 29	**210**	**2.54**	**1.08**	**49**	**2.31**	**.96**	**1.41**	**.16**
Item 30	210	3.09	1.08	49	3.55	1.02	-2.72	.01*
Item 31	212	3.55	1.03	49	3.84	1.05	-1.74	.08
Item 32A	210	4.18	.65	47	4.40	.71	-2.13	.03*
Item 32B	209	4.26	.57	49	4.51	.62	-2.73	.01*
Item 32C	209	3.85	.89	48	4.00	.90	-1.04	.30
Item 33A	212	4.33	.55	48	4.52	.58	-2.16	.03*
Item 33B	210	4.38	.51	49	4.53	.62	-1.85	.07
Item 33C	211	4.27	.56	49	4.41	.61	-1.59	.11
Item 34	210	2.38	1.05	48	2.44	.99	-.37	.71
Item 35	**208**	**2.20**	**.99**	**49**	**1.88**	**.70**	**2.14**	**.03***

Table 4.44. (Continued)

	Tenured			Not Tenured				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 36	**212**	**2.57**	**1.16**	**48**	**2.54**	**.97**	**.16**	**.87**
Item 37	**211**	**2.24**	**.92**	**49**	**2.24**	**.88**	**-.06**	**.96**
Item 38	**208**	**2.28**	**.96**	**47**	**2.36**	**1.01**	**-.50**	**.62**
Item 39	209	3.29	1.09	47	3.32	.94	-.19	.85
Item 40	212	2.76	.94	48	2.46	1.01	1.98	.05*
Item 41	211	4.22	.88	48	4.52	.55	-2.29	.02*
Item 42	211	3.89	.98	48	3.77	1.13	.75	.46
Item 43	**211**	**2.00**	**.90**	**49**	**1.92**	**.79**	**.59**	**.56**
Item 44	210	3.48	1.02	49	3.55	1.24	-.44	.66
Item 45	210	4.04	.98	47	3.79	1.12	1.54	.13
Item 46	206	3.42	1.05	48	3.56	1.15	-.82	.41
Item 47	210	3.67	1.07	47	3.74	1.22	-.41	.68
Item 48	210	2.79	1.08	49	2.76	1.07	.18	.86
Item 49	**211**	**3.00**	**1.01**	**47**	**3.06**	**.99**	**-.39**	**.70**
Item 50	211	4.09	1.02	47	3.83	1.07	1.60	.11
Item 51	**212**	**2.34**	**.94**	**45**	**2.27**	**1.01**	**.50**	**.62**
Item 52A	208	3.53	.96	47	3.62	.99	-.56	.57
Item 52B	205	3.20	1.01	46	3.15	1.03	.29	.77
Item 53	211	4.19	.73	47	4.17	.82	.20	.84
Item 54	212	4.27	.64	47	4.17	.73	.98	.33
Item 55	**212**	**3.33**	**1.15**	**47**	**3.66**	**.89**	**-7.82**	**.04***

*Significant at .05 level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

Table 4.45. Mean Scores, Standard Deviations, and F-values for Items 9A through 55 on the TQIAS for Faculty by Length of Time as a Faculty Member in a Higher Education Institution**

	10 years or less			11-20 years			Over 20 years			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 9											
Student	68	4.66	.59	83	4.76	.46	108	4.74	.66	.58	.56
Parent[1]	66	2.55[a]	.86	82	2.93[b]	.99	108	3.01[c]	.98	5.09	.01*
Alumni	68	2.59	.85	82	2.72	1.00	107	2.69	.95	.40	.67
Employers	68	3.31	.97	82	3.37	1.09	108	3.36	.95	.07	.93
Business/Ind	67	2.99	.93	83	2.93	1.00	107	3.02	.94	.21	.81
Sta./Loc. Gov.	68	2.63	.79	83	2.73	1.03	106	2.83	.98	.91	.40
Federal Gov.	68	2.49	.82	83	2.42	.91	107	2.60	.92	.95	.39
Faculty	68	4.06	.83	83	4.08	.95	107	4.18	.86	.46	.63
Other Offices	63	2.65	1.03	79	2.68	1.09	96	2.74	.94	.16	.86
Item 10	68	3.93	1.01	84	4.11	.96	109	3.88	.91	1.42	.24
Item 11	68	2.71	1.26	83	2.78	1.35	109	2.61	1.13	.44	.64
Item 12	68	3.44	1.01	84	3.54	.92	108	3.46	.97	.21	.81
Item 13	68	4.22	.64	84	4.25	.67	109	4.11	.74	1.09	.34
Item 14	**67**	**4.22**	**.83**	**84**	**4.12**	**1.02**	**109**	**4.29**	**.68**	**1.02**	**.36**
Item 15	67	4.33	.66	84	4.37	.72	109	4.16	.82	2.19	.11
Item 16	65	3.29	1.07	83	2.98	1.12	109	3.06	1.15	1.55	.21
Item 17	67	2.96	1.28	81	3.15	1.23	108	2.94	1.11	.82	.44
Item 18	67	3.54	1.01	83	3.39	.99	108	3.62	1.00	1.31	.27
Item 19	**68**	**2.34**	**1.05**	**84**	**2.24**	**1.08**	**108**	**2.47**	**.95**	**1.27**	**.28**
Item 20	**67**	**2.12**	**1.15**	**84**	**2.05**	**1.04**	**107**	**2.06**	**.89**	**.11**	**.90**
Item 21	**67**	**2.48**	**1.08**	**84**	**2.50**	**1.05**	**108**	**2.45**	**1.04**	**.05**	**.95**
Item 22	66	3.68	.86	84	3.71	.77	109	3.51	.87	1.60	.20
Item 23[2]	68	3.65[d]	.89	84	3.95[e]	.86	109	4.01[f]	.76	4.25	.02*
Item 24	67	3.01	1.05	82	2.89	1.04	107	2.84	1.07	.57	.57
Item 25	**68**	**3.01**	**.82**	**84**	**2.79**	**.95**	**108**	**3.06**	**.83**	**2.49**	**.08**
Item 26	68	4.51	.50	84	4.49	.59	108	4.33	.61	2.66	.07
Item 27	64	3.50	.87	82	3.50	1.05	105	3.54	.78	.07	.93
Item 28	**68**	**1.90**	**.92**	**84**	**1.88**	**.87**	**109**	**2.05**	**.88**	**1.02**	**.36**
Item 29	**68**	**2.38**	**.90**	**83**	**2.39**	**1.00**	**108**	**2.66**	**1.19**	**2.10**	**.12**
Item 30[3]	68	3.36[g]	1.04	84	3.33[h]	1.13	108	2.94[i]	1.03	4.43	.01*
Item 31	68	3.50	1.15	84	3.73	1.07	109	3.58	.93	.96	.38
Item 32A	66	4.26	.79	84	4.25	.60	107	4.17	.64	.51	.60
Item 32B	68	4.43	.63	82	4.30	.56	108	4.23	.57	2.32	.10
Item 32C	67	3.79	.99	83	3.98	.83	107	3.86	.88	.83	.44
Item 33A	67	4.43	.66	84	4.40	.52	109	4.29	.51	1.62	.20
Item 33B	68	4.49	.61	83	4.46	.50	108	4.31	.49	2.80	.06
Item 33C	68	4.35	.62	84	4.37	.53	108	4.19	.55	2.79	.06
Item 34	67	2.25	.94	83	2.53	1.11	108	2.36	1.04	1.38	.25
Item 35	**68**	**1.94**	**.77**	**83**	**2.19**	**1.04**	**106**	**2.22**	**.97**	**1.99**	**.14**

Table 4.45. (Continued)

	10 years or less			11-20 years			Over 20 years			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 36	**67**	**2.54**	**.99**	**84**	**2.51**	**1.24**	**109**	**2.62**	**1.12**	**.26**	**.77**
Item 37	**67**	**2.33**	**.91**	**84**	**2.26**	**.93**	**109**	**2.17**	**.89**	**.71**	**.49**
Item 38	**65**	**2.29**	**1.00**	**81**	**2.33**	**.91**	**109**	**2.28**	**1.01**	**.08**	**.92**
Item 39	65	3.43	.92	83	3.08	1.16	108	3.37	1.04	2.49	.09
Item 40	67	2.70	1.00	84	2.82	1.04	109	2.61	.86	1.10	.33
Item 41	67	4.28	.87	83	4.36	.73	109	4.20	.89	.87	.42
Item 42	67	3.72	1.07	84	3.96	.96	108	3.89	1.00	1.17	.31
Item 43[4]	**68**	**1.94**	**.75**	**83**	**2.19**[j]	**.96**	**109**	**1.85**[k]	**.87**	**3.71**	**.03***
Item 44	67	3.54[l]	1.16	84	3.42[m]	1.07	108	3.52[n]	1.00	.30	.74
Item 45[5]	66	3.73[o]	1.05	84	4.12[p]	.88	107	4.06[q]	1.06	3.19	.04*
Item 46	65	3.40	1.07	84	3.57	.97	105	3.38	1.14	.83	.44
Item 47	65	3.55	1.16	83	3.72	1.11	109	3.73	1.05	.62	.54
Item 48	68	2.79	1.07	83	2.89	1.08	108	2.69	1.06	.88	.42
Item 49	**66**	**3.00**	**1.04**	**84**	**3.02**	**1.04**	**108**	**3.01**	**.97**	**.01**	**.99**
Item 50[6]	66	3.76[r]	1.15	84	4.14[s]	.92	108	4.15[t]	1.01	3.55	.03*
Item 51	**64**	**2.30**	**.90**	**84**	**2.45**	**1.07**	**109**	**2.26**	**.89**	**1.05**	**.35**
Item 52A	66	3.42	.93	82	3.66	.95	107	3.53	1.00	1.09	.34
Item 52B	65	3.14	.92	81	3.22	1.11	105	3.20	.99	.13	.88
Item 53	66	4.08	.79	83	4.28	.67	109	4.19	.78	1.34	.26
Item 54[7]	66	4.06[u]	.70	84	4.38[v]	.60	109	4.28[w]	.65	4.62	.01*
Item 55	**66**	**3.45**	**.98**	**84**	**3.40**	**1.16**	**109**	**3.35**	**1.16**	**.19**	**.83**

[1]SNK's test: a is significantly different from b and c. Scheffe's test: a is significantly different from c.

[2]SNK's test: d is significantly different from e and f. Scheffe's test: d is significantly different from f.

[3]SNK's and Scheffe's tests: g is significantly different from h and i.

[4]SNK's and Scheffe's tests: j is significantly different from k.

[5]SNK's test: o is significantly different from p and q.

[6]SNK's test: r is significantly different from s and t.

[7]SNK's test: u is significantly different from v and w. Scheffe's test: u is significantly different from v.

*Significant difference at $\alpha = .05$ level.

**For the items in bold type, a lower score on the item indicates more favorable attitude toward a principle of TQI

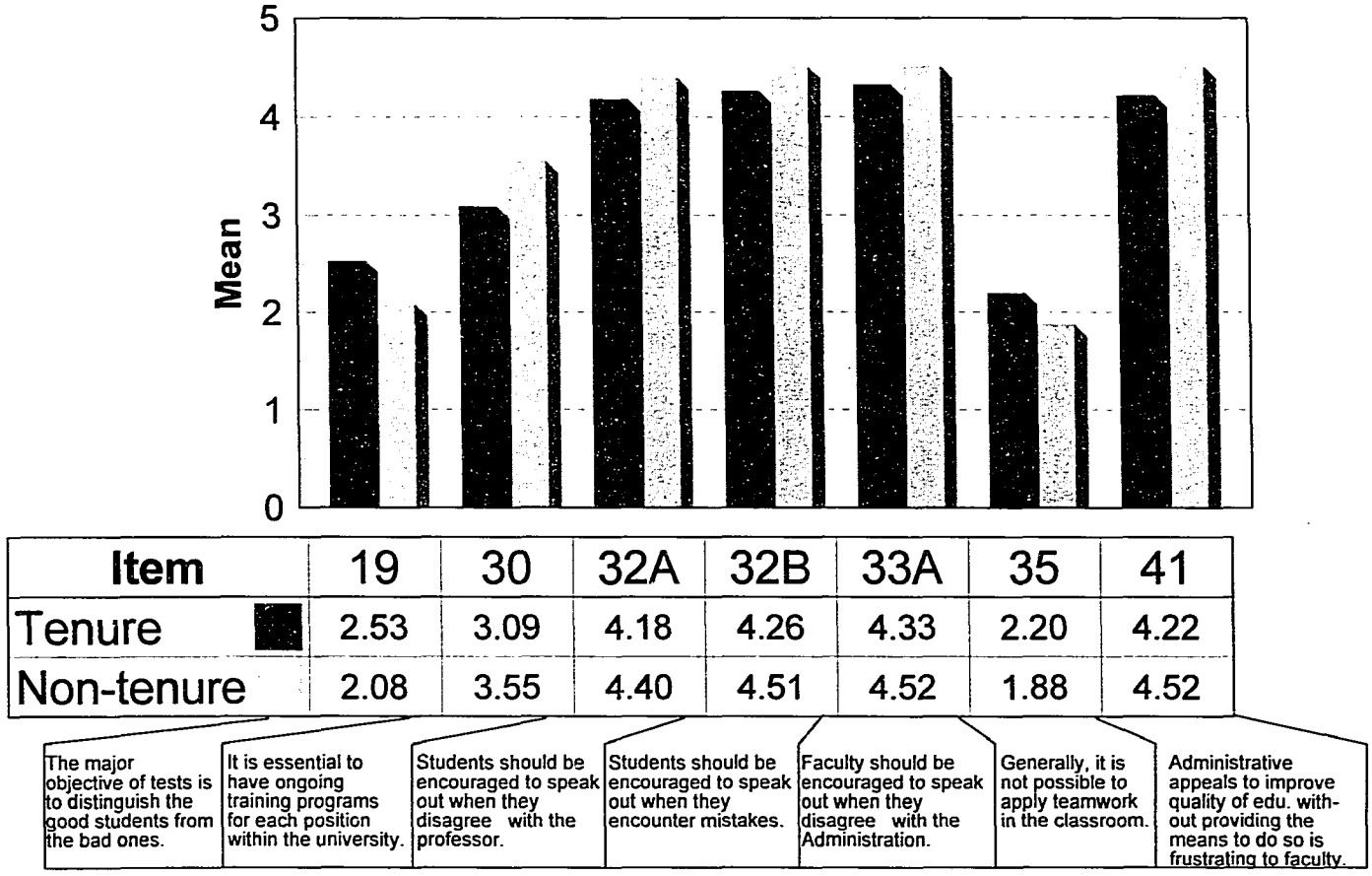
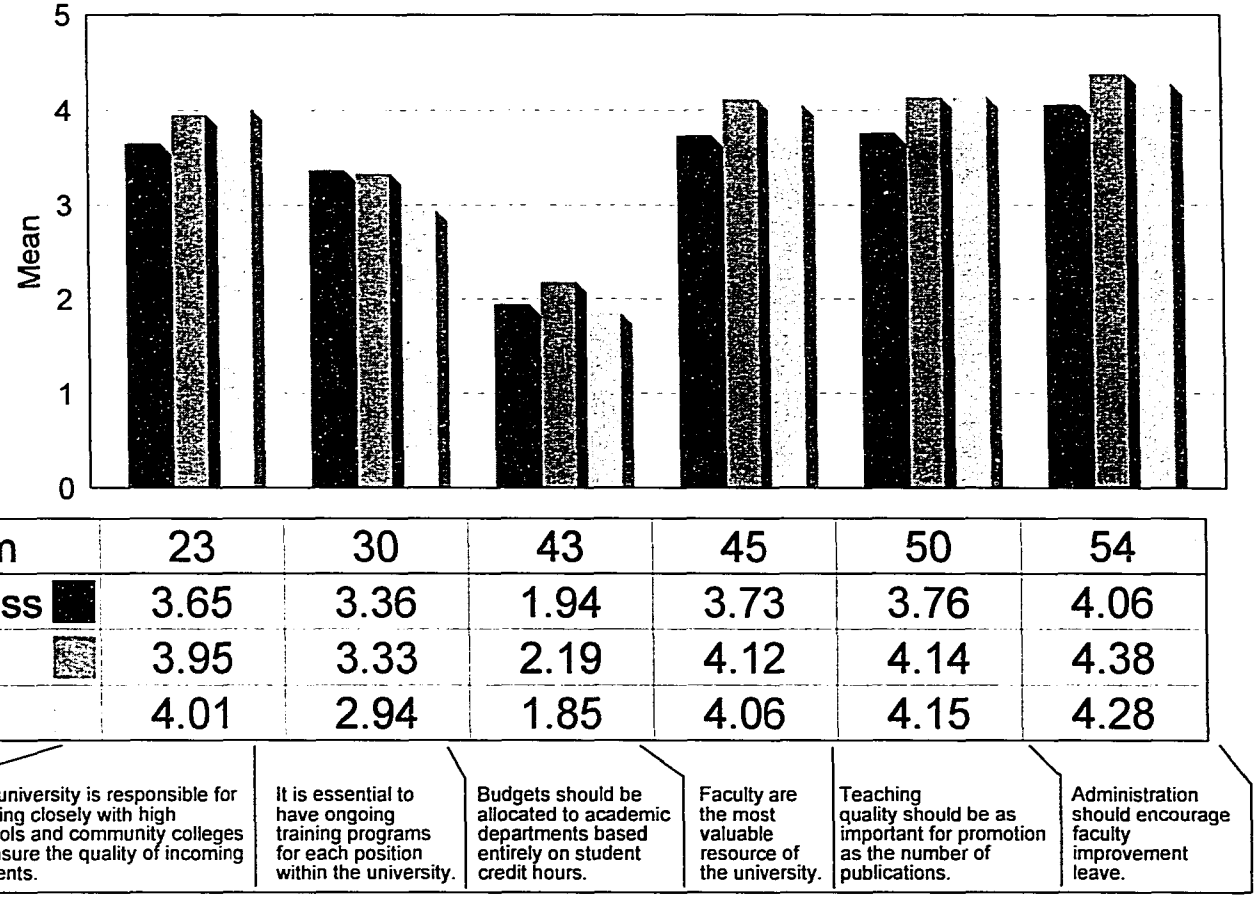


Figure 4.16. Bar Diagrams Depicting the Comparison of Faculty Across Tenure on Items 19, 30, 32A, 32B, 33A, 35, and 41. Significant Differences Were Found Among These Items Across Tenure.



Item	23	30	43	45	50	54
10 or less	3.65	3.36	1.94	3.73	3.76	4.06
11 - 20	3.95	3.33	2.19	4.12	4.14	4.38
over 20	4.01	2.94	1.85	4.06	4.15	4.28

23	30	43	45	50	54
The university is responsible for working closely with high schools and community colleges to ensure the quality of incoming students.	It is essential to have ongoing training programs for each position within the university.	Budgets should be allocated to academic departments based entirely on student credit hours.	Faculty are the most valuable resource of the university.	Teaching quality should be as important for promotion as the number of publications.	Administration should encourage faculty improvement leave.

Figure 4.17. Bar Diagrams Showing the Comparison of Faculty Across Length of Time as a Faculty Member in a Higher Education Institution on Items 23, 30, 43, 45, 50, and 54. Significant Differences Were Found Among These Items Across Length of Time as a Faculty Member.

Table 4.46. Summary Distribution of the Mean Scores of All the Items Across All Subgroups of the Study*

Item Number and Description	Administrative appointment	
	Faculty	DEO
9A. How important is it for the university to meet the needs of **students?**	4.7	4.8
9B. How important is it for the university to meet the needs of **parents?**	2.9	3.1
9C. How important is it for the university to meet the needs of **alumni?**	2.7	2.9
9D. How important is it for the university to meet the needs of **employers of university graduates?**	3.4	3.6
9E. How important is it for the university to meet the needs of **business/industry?**	2.8	3.0
9F. How important is it for the university to meet the needs of **state and local government?**	3.0	3.0
9G. How important is it for the university to meet the needs of **federal government?**	2.5	2.7
9H. How important is it for the university to meet the needs of **faculty?**	4.1	4.1
9I. How important is it for the university to meet the needs of **other university offices?**	2.7	2.9
10. The university, and all the departments within the university, should have a clearly stated mission statement.	4.0	4.2
11. A mission statement should clearly outline where the organization stands on every issue that is important to the long term existence of the organization.	2.7	2.5
12. Overall satisfaction of the users of the university/department services is an important issue that should be addressed in the mission statement.	3.5	3.4
13. The university should periodically and systematically solicit feedback from employers of its graduates.	4.2	4.9
14. We need to accept that there always will be students who fail and drop out of the university.	4.2	4.1
15. It is cheaper to spend more resources to do things right the first time, than to rush and later redo the defects.	4.3	4.3
16. There are students who graduate from this department without acquiring basic skills needed to perform a job in their field.	***3.1***	***2.6***
17. Grading on the curve is the same as planning for some students to fail and/or some students to pass the course with less competency than others.	3.0	3.0
18. Tests should be given for the purpose of finding possible mistakes so that corrective action can be taken before the end of the semester.	3.5	3.3
19. The major objective of tests is to distinguish the good students from the bad ones.	2.4	2.4
20. A good measure of controlling the quality of education is mass testing of graduates on state mandated exams.	2.1	2.0
21. Awarding contracts to the lowest bidder will help the university to keep its costs down.	2.5	2.6
22. University purchasing policy should be determined more by quality of the item than by price.	3.6	3.7
23. The university is responsible for working closely with high schools and community colleges to ensure that incoming students are adequately prepared.	3.9	3.8
24. Placing emphasis on meeting standards and quotas keeps me from performing my best.	2.9	2.9
25. The best academic programs are those that have met the standards of the accreditation agencies.	3.0	2.7
26. I am always looking for new ways to improve my professional performance.	4.4	4.4
27. All personnel should be oriented to the functions of all divisions in the university that can either affect, or be affected by, the performance of their unit.	3.5	3.7
28. Faculty with high credentials in their subject matter do not need training in pedagogical skills.	2.0	2.0

*Notes: For shaded items a lower mean score indicates a more favorable attitude toward the TQI principle.
At least one of the mean scores of sub-groups, for which the numbers are printed in bold is different than the oth
Within each group of demographic variables items that are both in bold and italic are different from each other.

l Subgroups of the Study*

	Administrative appointment		Academic Rank			Gender		College								Age							Tenure		Length of time as a Faculty Member		
	Faculty	DEO	Full Prof.	Assoc. Prof.	Assist. prof.	Male	Female	Agriculture	Business	Design	Education	Engineering	F. & C. Sci.	L. A. & Sci.	Vet. Med.	Library	30 or less	31-35	36-40	41-45	46-50	51-55	56 and over	Yes	No	10 = > years	11-20 years	20 < years
	4.7	4.8	4.8	4.7	4.7	4.7	4.8	4.8	4.7	4.7	4.8	4.8	4.9	4.6	4.6	4.9	4.9	4.7	4.7	4.7	4.7	4.7	4.8	4.7	4.7	4.7	4.8	4.7
	2.9	3.1	***3.0***	***2.9***	***2.5***	2.9	2.7	3.1	3.0	2.8	3.0	3.0	2.9	2.6	3.1	2.9	2.1	2.5	2.6	2.7	3.0	3.1	2.9	***3.0***	***2.3***	***2.6***	***2.9***	***3.0***
	2.7	2.9	2.7	2.7	2.6	2.7	2.5	***2.9***	**3.1**	***2.1***	***2.3***	***2.8***	**2.9**	***2.4***	***3.3***	**2.8**	2.6	2.5	2.5	2.5	2.7	2.7	2.7	2.7	2.6	2.6	2.7	2.7
	3.4	3.6	3.3	3.4	3.3	3.4	3.4	3.5	3.6	3.2	3.4	3.6	3.8	3.1	3.2	3.0	4.0	3.6	3.3	3.3	3.2	3.2	3.4	3.3	3.4	3.3	3.4	3.4
	2.8	3.0	3.0	2.9	3.1	2.8	2.6	***3.2***	**3.2**	**2.4**	**3.3**	***3.4***	**3.4**	***2.6***	**2.9**	**3.0**	3.8	3.3	2.9	2.8	2.9	3.0	3.0	2.8	2.7	3.0	2.9	3.0
	3.0	3.0	2.7	2.8	2.7	3.0	2.9	2.9	2.7	2.5	2.8	2.9	3.2	2.5	2.9	2.5	3.0	2.7	2.6	2.8	2.6	2.8	2.8	3.0	3.0	2.6	2.7	2.8
	2.5	2.7	2.5	2.6	2.5	2.5	2.5	2.5	2.6	2.4	2.5	2.6	2.9	2.4	2.7	2.0	3.0	2.5	2.4	2.5	2.4	2.5	2.6	2.5	2.6	2.5	2.4	2.6
	4.1	4.1	4.1	4.1	4.3	***4.0***	***4.5***	3.9	4.1	4.0	4.3	4.0	4.5	4.2	4.0	4.6	4.5	4.3	4.0	3.9	4.2	4.0	4.2	4.1	4.2	4.1	4.1	4.2
	2.7	2.9	2.7	2.6	2.8	2.6	2.9	2.7	2.7	2.7	2.7	2.7	3.2	2.5	2.9	3.3	3.3	2.5	2.5	2.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	4.0	4.2	3.9	4.1	3.9	3.9	4.1	**4.0**	**4.3**	**4.0**	**4.5**	***4.1***	***4.3***	***3.6***	***4.4***	**4.0**	3.9	3.6	4.1	4.1	4.2	3.9	3.8	4.0	4.0	3.9	4.1	3.9
term existence of the organization.	2.7	2.5	2.6	2.7	2.8	***2.6***	***3.0***	2.5	2.8	3.1	2.4	3.1	2.9	2.5	3.1	2.6	2.8	2.5	2.8	2.7	3.0	2.4	2.7	2.7	2.7	2.7	2.8	2.6
in the mission statement.	3.5	3.4	3.4	3.5	3.6	3.5	3.6	3.3	3.9	3.2	3.6	3.7	3.7	3.3	3.7	3.8	4.0	3.2	3.5	3.4	3.6	3.5	3.5	3.5	3.6	3.4	3.5	3.5
	4.2	4.9	4.2	4.2	4.2	4.2	4.2	***4.3***	**4.2**	**4.1**	**4.5**	***4.3***	***4.5***	***3.9***	**4.3**	**4.3**	4.3	4.2	4.3	4.3	4.1	4.1	4.2	4.2	4.3	4.2	4.3	4.1
	4.2	4.1	4.2	4.3	4.2	4.3	4.1	4.2	4.2	4.4	3.8	4.2	3.7	4.3	4.3	4.5	4.4	4.2	4.1	4.2	4.1	4.3	4.3	4.2	4.1	4.2	4.1	4.3
	4.3	4.3	4.2	4.3	4.4	***4.2***	***4.5***	***4.0***	**4.2**	**4.3**	**4.6**	***4.4***	**4.5**	**4.3**	**4.6**	**4.1**	4.1	4.5	4.4	4.3	4.3	4.1	4.3	4.2	4.4	4.3	4.4	4.2
ield.	***3.1***	***2.6***	3.0	3.2	3.3	3.1	3.0	2.8	2.4	3.3	3.3	3.2	3.1	3.2	3.4	3.3	2.8	3.2	3.1	3.0	3.1	2.9	3.2	3.0	3.3	3.3	3.0	3.1
ess competency than others.	3.0	3.0	2.8	3.2	3.0	3.0	3.1	2.8	2.0	3.0	3.3	3.1	3.4	3.1	3.2	2.8	2.4	2.8	3.1	3.2	3.1	2.8	3.1	3.0	3.0	3.0	3.2	2.9
id of the semester.	3.5	3.3	3.4	3.5	3.8	3.6	3.4	3.5	3.4	3.8	3.3	3.7	3.4	3.5	3.4	3.6	3.6	3.5	3.6	3.6	3.4	3.5	3.6	3.5	3.7	3.5	3.4	3.6
	2.4	2.4	***2.5***	***2.4***	***2.0***	***2.5***	***2.0***	2.5	3.2	2.3	1.8	2.3	2.3	2.4	2.3	2.0	2.4	2.2	2.4	2.3	2.3	2.3	2.5	***2.4***	***2.1***	2.3	2.2	2.5
	2.1	2.0	2.1	2.0	2.0	2.1	1.9	1.9	2.0	2.1	1.7	2.4	1.6	2.2	1.8	1.7	2.3	2.0	1.9	2.1	2.2	1.9	2.1	2.1	2.2	2.1	2.1	2.1
	2.5	2.6	2.6	2.4	2.3	***2.5***	***2.2***	***2.9***	**2.8**	***1.7***	**2.6**	**2.3**	**2.3**	**2.4**	**2.5**	**2.0**	3.1	2.1	2.3	2.5	2.5	2.6	2.4	2.5	2.4	2.5	2.5	2.5
	3.6	3.7	3.5	3.6	3.8	3.6	3.8	3.5	3.1	3.7	3.3	3.7	3.7	3.6	4.1	3.6	3.4	3.9	3.9	3.6	3.6	3.5	3.6	3.6	3.8	3.7	3.7	3.5
udents are adequately prepared.	3.9	3.8	4.0	3.9	3.8	3.9	4.0	3.9	3.8	3.7	4.2	4.1	3.9	3.8	3.6	4.1	3.8	3.3	3.9	3.8	4.0	4.2	3.9	3.9	3.7	***3.7***	***4.0***	***4.0***
	2.9	2.9	2.9	2.8	3.0	2.9	2.8	2.9	2.8	2.4	2.8	2.9	3.3	2.9	2.7	3.3	2.6	3.1	3.1	3.0	2.7	2.8	2.9	2.9	3.0	3.0	2.9	2.8
	3.0	2.7	3.0	3.0	2.9	3.0	2.9	2.9	3.2	3.0	2.8	3.0	2.7	3.0	2.8	2.8	2.9	3.2	2.8	2.9	2.9	3.1	3.0	3.0	2.9	3.0	2.8	3.1
	4.4	4.4	4.4	4.5	4.5	***4.4***	***4.7***	4.4	4.6	4.6	4.7	4.4	4.6	4.4	4.5	4.4	4.5	4.5	4.5	4.5	4.5	4.3	4.4	4.4	4.6	4.5	4.5	4.3
by, the performance of their unit.	3.5	3.7	3.5	3.5	3.6	3.5	3.7	***3.5***	**3.6**	**3.6**	**3.4**	**3.6**	**3.9**	***3.4***	***3.6***	***4.5***	3.4	3.8	3.3	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	2.0	2.0	***2.1***	**1.9**	***1.7***	2.0	1.8	2.1	2.3	1.9	2.0	2.2	1.8	1.9	1.8	1.4	1.4	1.8	2.0	1.9	1.8	2.1	2.1	2.0	1.8	1.9	1.9	2.1

ward the TQI principle.
printed in bold is different than the others.
l italic are different from each other.

Table 4.46. (continued)

Item Number and Description	Administrative appointment		Academic Rank	
	Faculty	DEO	Full Prof.	Assoc. Prof.
29. The best teachers are the ones who have high credentials in their field of study.	2.5	2.8	*2.7*	*2.4*
30. It is essential that the university have ongoing training programs for each position within the university.	3.2	3.5	*3.0*	*3.2*
31. Each department should provide personnel orientation programs to thoroughly orient new staff and faculty in the policies, procedures, and culture of the ...	3.6	3.5	3.5	3.5
32A. Students should be encouraged to speak out, without fear of reprisal, when they disagree with the professor.	4.2	4.3	4.2	4.1
32B. Students should be encouraged to speak out, without fear of reprisal, when they encounter mistakes.	4.3	4.4	4.3	4.2
32C. Students should be encouraged to speak out, without fear of reprisal, when they have ideas about the way the teaching should be done.	3.9	3.8	3.9	3.8
33A. Faculty and staff should be encouraged to speak out, without fear of administrative reprisal, when they disagree with administration.	4.4	4.4	4.4	4.3
33B. Faculty and staff should be encouraged to speak out, without fear of administrative reprisal, when they encounter mistakes.	4.4	4.7	4.4	4.4
33C. Faculty and staff should be encouraged to speak out, without fear of administrative reprisal, when they have ideas regarding university operations.	4.3	4.3	4.2	4.3
34. Evaluation methods that are based on the performance of the department as a whole, are preferable to those that reward individual performance.	2.4	2.4	2.4	2.3
35. Generally, it is not possible to apply teamwork in the classroom.	2.1	2.0	2.2	2.2
36. Competition among the faculty increases the quality of their performance.	*2.6*	*3.1*	2.7	2.5
37. Teamwork decreases the incentive of those who do outstanding work.	2.2	2.2	2.2	2.4
38. Slogans that promote improving the quality of performance are more effective than reports of past performance.	2.3	2.2	2.2	2.3
39. Asking faculty to lower the percentage of Ds and Fs in a course implies that it is the faculty's fault that students fail.	3.3	3.3	3.2	3.4
40. Encouraging poorly performing students to study harder is seldom effective.	2.7	2.6	*2.6*	*3.0*
41. Administrative appeal to improve the quality of education, without providing the means to do so, is frustrating to faculty.	4.3	4.3	4.2	4.3
42. Placing students in an overcrowded class is robbing them of quality education.	3.9	3.6	3.8	4.0
43. Budgets should be allocated to academic departments based entirely on student credit hours.	2.0	1.9	*1.9*	*2.2*
44. Basing scholarly growth on the number of publications reduces the quality of the research.	3.5	3.3	*3.3*	*3.7*
45. Faculty are the most valuable resource of the university.	4.0	4.3	4.1	4.0
46. Students are the most valuable resource of the university.	3.5	3.6	3.4	3.4
47. All university personnel are invaluable to the functions of the university and should be treated as such.	3.7	4.0	3.7	3.6
48. Annual reviews only reward short term thinking.	*2.8*	*2.1*	2.7	2.9
49. The annual performance review is a good measure of the performance of employees.	*3.0*	*3.4*	3.1	2.9
50. Teaching quality should be as important for promotion as the number of publications.	4.1	4.0	4.0	4.2
51. The university's scarce resources should not be used to promote the personal growth and development of university personnel, other than faculty.	2.3	2.0	2.3	2.4
52A. If the skills of personnel become obsolete, it is the responsibility of the university to reeducate and retrain them.	3.6	3.7	3.5	3.5
52B. If the skills of personnel become obsolete, it is the responsibility of the university to reassign them to other positions.	3.2	3.2	3.2	3.2
53. Talents and contributions of everyone in the system regardless of rank, seniority, and responsibility must be utilized to solve the problems.	4.2	4.3	4.2	4.2
54. Administration should encourage faculty improvement leave.	4.3	4.3	4.3	4.2
55. Overall, faculty and administration seek different objectives with regard to the university.	*3.4*	*2.8*	3.3	3.5

	Administrative appointment		Academic Rank			Gender		College								Age							Tenure		Length of time as a Faculty Member		
	Faculty	DEO	Full Prof.	Assoc. Prof.	Assist. prof.	Male	Female	Agriculture	Business	Design	Education	Engineering	F. & C. Sci.	L. A. & Sci.	Vet. Med.	Library	30 or less	31-35	36-40	41-45	46-50	51-55	56 and over	Yes	No	10= > years	11-20 years	20 < years
	2.5	2.8	*2.7*	*2.4*	*2.3*	2.5	2.4	*2.7*	**3.0**	**2.5**	**2.4**	**2.5**	**2.1**	*2.6*	*1.8*	**2.4**	2.4	2.4	2.3	2.5	2.3	2.5	2.7	2.5	2.3	2.4	2.4	2.7
	3.2	3.5	*3.0*	*3.2*	*3.6*	*3.1*	*3.4*	3.2	3.0	3.6	3.6	3.1	3.7	2.9	3.6	3.6	3.4	3.6	3.2	3.6	3.2	3.0	3.0	*3.1*	*3.6*	*3.4*	*3.3*	*2.9*
s, procedures, and culture of the ...	3.6	3.5	3.5	3.5	3.9	*3.5*	*3.9*	*3.4*	**3.4**	**3.6**	**4.3**	**3.5**	**3.9**	*3.5*	**3.7**	*4.6*	3.6	4.0	3.4	3.7	3.7	3.8	3.5	3.6	3.8	3.5	3.7	3.6
	4.2	4.3	4.2	4.1	4.4	4.2	4.2	4.2	4.0	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.6	4.3	4.3	4.3	4.2	4.1	4.2	*4.2*	*4.4*	4.3	4.3	4.2
	4.3	4.4	4.3	4.2	4.4	4.2	4.3	4.3	4.1	4.2	4.4	4.4	4.3	4.3	4.2	4.3	4.6	4.5	4.4	4.4	4.3	4.3	4.2	*4.3*	*4.5*	4.4	4.3	4.2
g should be done.	3.9	3.8	3.9	3.8	4.0	3.9	4.0	3.9	3.3	3.6	3.5	3.7	4.2	4.0	3.6	4.4	4.1	4.2	3.8	3.7	4.1	3.9	3.8	3.9	4.0	3.8	4.0	3.9
administration.	4.4	4.4	4.4	4.3	4.4	4.4	4.4	4.4	4.0	4.4	4.1	4.4	4.4	4.4	4.3	4.4	4.4	4.5	4.4	4.5	4.3	4.3	4.3	*4.3*	*4.5*	4.4	4.4	4.3
takes.	4.4	4.7	4.4	4.4	4.5	4.4	4.4	4.4	4.1	4.5	4.3	4.5	4.3	4.4	4.4	4.4	4.5	5.6	4.5	4.5	4.4	4.4	4.3	4.4	4.5	4.5	4.5	4.3
arding university operations.	4.3	4.3	4.2	4.3	4.4	4.3	4.4	4.3	4.0	4.2	4.3	4.2	4.3	4.3	4.3	4.4	4.4	4.5	4.3	4.3	4.4	4.2	4.2	4.3	4.4	4.4	4.4	4.2
d individual performance.	2.4	2.4	2.4	2.3	2.5	2.4	2.4	2.2	1.9	2.8	2.8	2.6	2.5	2.4	2.4	2.9	2.9	1.9	2.3	2.7	2.3	2.2	2.5	2.4	2.4	2.3	2.5	2.4
	2.1	2.0	2.2	2.2	2.0	*2.2*	*1.9*	2.1	2.0	2.2	2.0	2.2	1.8	2.3	2.0	2.1	1.6	2.1	2.1	2.0	2.0	2.2	2.3	*2.2*	*1.9*	1.9	2.2	2.2
	2.6	*3.1*	2.7	2.5	2.4	*2.7*	*2.1*	*2.7*	*3.7*	**2.4**	*1.8*	*2.6*	*2.1*	**2.5**	**2.6**	**2.1**	2.4	2.3	2.6	2.6	2.7	2.7	2.5	2.6	2.5	2.5	2.5	2.6
	2.2	2.2	2.2	2.4	2.1	*2.3*	*2.0*	*2.1*	*3.3*	*1.9*	*1.9*	*2.4*	*1.9*	*2.3*	*1.9*	**2.4**	2.3	2.3	2.3	2.2	2.3	2.0	2.3	2.2	2.2	2.3	2.3	2.2
	2.3	2.2	2.2	2.3	2.5	2.3	2.4	2.4	2.0	2.5	2.0	2.2	2.7	2.2	2.5	2.5	2.4	2.8	2.2	2.1	2.5	2.1	2.4	2.3	2.4	2.3	2.3	2.3
	3.3	3.3	3.2	3.4	3.3	*3.2*	*3.6*	3.2	3.0	3.2	2.8	3.4	3.5	3.4	3.2	3.6	3.3	3.9	3.1	3.1	3.1	3.6	3.4	3.3	3.3	3.4	3.1	3.4
	2.7	2.6	*2.6*	*3.0*	*2.5*	2.7	2.7	2.5	2.3	2.6	3.3	2.7	2.5	2.8	2.4	3.1	2.6	2.6	2.6	2.7	2.8	2.5	2.8	*2.8*	*2.5*	2.7	2.8	2.6
.	4.3	4.3	4.2	4.3	4.5	*4.2*	*4.6*	4.1	4.0	4.2	4.5	4.2	4.6	4.4	4.3	4.8	4.1	4.4	4.3	4.3	4.4	4.3	4.2	*4.2*	*4.5*	4.3	4.4	4.2
	3.9	3.6	3.8	4.0	3.9	3.8	4.1	3.7	3.8	3.6	4.0	3.9	4.2	4.0	3.8	3.5	3.1	4.2	3.6	3.9	4.0	4.1	3.9	3.9	3.8	3.7	4.0	3.9
	2.0	1.9	*1.9*	*2.2*	**1.9**	2.0	2.0	1.8	2.1	2.2	2.3	2.1	1.9	2.0	1.8	2.0	1.8	1.9	2.1	2.1	2.2	1.9	1.9	2.0	1.9	**1.9**	*2.2*	*1.9*
	3.5	3.3	*3.3*	*3.7*	*3.6*	*3.4*	*3.7*	*3.1*	*3.3*	*3.5*	*3.2*	*3.8*	*3.9*	*3.5*	*3.8*	*3.8*	4.0	3.5	3.6	3.3	3.3	3.4	3.6	3.5	3.6	3.5	3.4	3.5
	4.0	4.3	4.1	4.0	3.9	4.0	4.0	4.0	4.4	3.9	4.4	4.1	4.4	3.9	3.8	3.1	3.3	3.9	3.8	3.9	4.0	4.0	4.2	4.0	3.8	*3.7*	*4.1*	*4.1*
	3.5	3.6	3.4	3.4	3.5	3.5	3.4	3.5	3.5	3.7	3.5	3.5	3.6	3.3	3.3	3.0	3.7	3.8	3.2	3.6	3.4	3.3	3.5	3.4	3.6	3.4	3.6	3.4
	3.7	4.0	3.7	3.6	3.8	3.6	3.9	3.6	3.4	3.6	3.9	3.8	4.3	3.7	3.4	3.9	3.3	3.2	3.6	3.9	3.9	3.4	3.7	3.7	3.7	3.6	3.7	3.7
	2.8	*2.1*	2.7	2.9	2.8	2.8	2.8	2.6	3.4	2.5	2.9	2.9	2.5	2.9	2.8	2.9	3.3	2.9	2.8	3.0	2.7	2.4	2.8	2.8	2.8	2.8	2.9	2.7
	3.0	*3.4*	3.1	2.9	3.1	3.0	3.1	3.2	3.1	3.2	2.9	2.9	3.1	3.0	2.8	2.9	3.1	3.1	3.3	2.8	3.2	3.0	2.9	3.0	3.1	3.0	3.0	3.0
	4.1	4.0	4.0	4.2	4.0	4.0	4.2	4.0	3.6	4.4	3.7	4.2	4.5	4.0	4.2	4.5	4.3	3.5	4.0	4.0	4.2	4.1	4.1	4.1	3.8	*3.8*	*4.1*	*4.2*
onnel, other than faculty.	2.3	2.0	2.3	2.4	2.3	2.4	2.2	2.3	2.6	2.2	2.7	2.4	1.9	2.3	2.2	2.0	2.7	2.2	2.5	2.1	2.5	2.2	2.4	2.3	2.3	2.3	2.5	2.3
	3.6	3.7	3.5	3.5	3.7	3.5	3.8	3.3	3.7	3.6	3.6	3.5	3.8	3.7	3.6	3.6	3.3	3.6	3.4	3.8	3.5	3.4	3.6	3.5	3.6	3.4	3.7	3.5
	3.2	3.2	3.2	3.2	3.1	*3.1*	*3.5*	3.1	3.4	3.3	3.0	3.2	3.3	3.3	3.3	2.5	3.1	3.1	3.0	3.3	3.3	3.2	3.2	3.2	3.2	3.1	3.2	3.2
lve the problems.	4.2	4.3	4.2	4.2	4.2	*4.1*	*4.4*	4.0	4.2	4.5	4.1	4.2	4.5	4.1	4.4	4.1	3.7	4.2	4.1	4.4	4.2	4.3	4.1	4.2	4.2	4.1	4.3	4.2
	4.3	4.3	4.3	4.2	4.2	*4.2*	*4.4*	**4.3**	**4.1**	**4.1**	**4.4**	**4.0**	**4.4**	*4.3*	*4.6*	**4.4**	3.9	**4.4**	*3.9*	*4.4*	*4.4*	*4.3*	*4.2*	4.3	4.2	*4.1*	*4.4*	*4.3*
	3.4	*2.8*	3.3	3.5	3.5	3.4	3.3	3.3	2.9	3.3	3.3	3.4	3.3	3.5	3.4	3.6	3.3	3.7	3.7	3.3	3.2	3.4	3.4	*3.3*	*3.7*	3.5	3.4	3.4

The Factor Analysis

In constructing the instrument for the study, the items were selected so that they cover all of the 14 points of Deming's theory of TQI as they relate to the higher education setting. Items 9A through 9I had a different scale than items 10 through 55 and were intended to identify the importance of fulfilling the needs of some of the university's constituents, as perceived by the faculty. The scale for these items ranged from "not important" to "extremely important". The statistics relating to these items were reported earlier, and although identifying the customer and satisfying needs of the customer is stressed in Deming's philosophy, for the purpose of this research no further analysis was performed on these items.

Responses on items 10 through 55 were measured on a scale ranging from strongly disagree to strongly agree. For fifteen of these items a negative response (strongly disagree or disagree) and for the rest of the items a positive response (strongly agree or agree) would indicate a positive attitude toward a component of Deming's theory. To the faculty, however, many of these items, although specific to the theory, may have been implicit of other concepts. Therefore, scores obtained from the sum of the responses on items constituting a point (negative items recoded) may not be a reliable estimate of the individual's attitude toward Deming's point. Thus, in order to examine any potential subscales within the instrument an exploratory factor analysis was performed on items 10 through 55 using principle component analysis and rotated by the Kaiser Varimax method of rotation.

The analysis revealed the existence of 14 factors with Eigenvalues greater than one that explain 63.5% of the total variation (Figure 4.18). Table 4.47 shows the percent of variation explained by each factor and the Chronbach alpha reliability coefficients associated with these

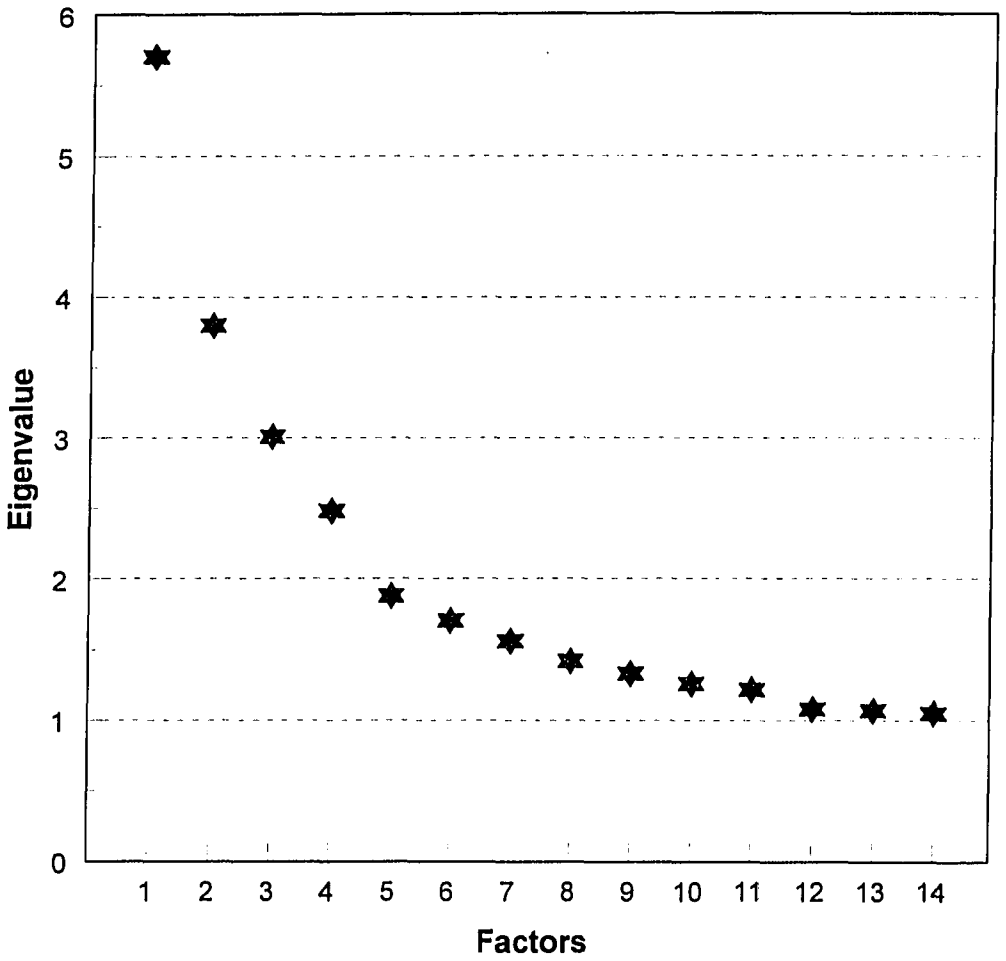


Figure 4.18. Plot of Eigenvalues for Items 10 through 55 for Faculty Sample Only.

factors. Following is a list of the items contained in each factor. However, for the purpose of this study, only factors one through eight, which have reliability coefficients greater than .50 were discussed and analyzed.

Factor 1

32. Students should be encouraged to speak out, without fear of reprisal, when they:

    A disagree with the professor
    B encounter mistakes
    C have ideas about the way the teaching should be done

33. Faculty and staff should be encouraged to speak out, without fear of administrative reprisal, when they:

    A disagree with administration
    B encounter mistakes
    C have ideas regarding university operations

Factor 2

31. Each department should provide personnel orientation programs to thoroughly orient new staff and faculty in the policies, procedures, and culture of the institution.

30. It is essential that the university have ongoing training programs for each position within the university.

27. All university personnel should be oriented to the functions of all divisions in the university that can either affect, or be affected by, the performance of their department/unit.

Factor 3

12. Overall satisfaction of the users of the university/department services is an important issue that should be addressed in the mission statement.

11. A mission statement should clearly outline where the organization stands on every issue that is important to the long term existence of the organization.

10. The university, and all the departments within the university, should have a clearly stated mission statement.

Factor 4

24. Placing emphasis on meeting standards and quotas keeps me from performing my best.

40. Encouraging poorly performing students to study harder is seldom effective.

48. Annual reviews only reward short term thinking.

49. The annual performance review is a good measure of the performance of employees.

Factor 5

23. The university is responsible for working closely with high schools and community colleges to ensure that incoming students are adequately prepared.

45. Faculty are the most valuable resource of the university.

52A. If the skills of personnel become obsolete, it is the responsibility of the university to reeducate and retrain them

53. Talents and contributions of everyone in the system regardless of rank, seniority, and responsibility must be utilized to solve the problems.

54. Administration should encourage faculty improvement leave.

Factor 6

28. Faculty with high credentials in their subject matter do not need training in pedagogical skills.

29. The best teachers are the ones who have high credentials in their field of study.

50. Teaching quality should be as important for promotion as the number of publications.

Factor 7

35. Generally, it is not possible to apply teamwork in the classroom.

36. Competition among the faculty increases the quality of their performance.

37. Teamwork decreases the incentive of those who do outstanding work.

Factor 8

19. The major objective of tests is to distinguish the good students from the bad ones.

20. A good measure of controlling the quality of education is mass testing of graduates on state mandated exams.

21. Awarding contracts to the lowest bidder will help the university to keep its costs down.

22. University purchasing policy should be determined more by quality of the item than by price.

25. The best academic programs are those that have met the standards of the accreditation agencies.

Factor 9

39. Asking faculty to lower the percentage of Ds and Fs in a course implies that it is the faculty's fault that students fail.

41. Administrative appeal to improve the quality of education, without providing the means to do so, is frustrating to faculty.

44. Basing scholarly growth on the number of publications reduces the quality of the research.

Factor 10

43. Budgets should be allocated to academic departments based entirely on student credit hours.

51. The university's scarce resources should not be used to promote the personal growth and development of university personnel, other than faculty.

Factor 11

17. Grading on the curve is the same as planning for some students to fail and/or some students to pass the course with less competency than others.

18. Tests should be given for the purpose of finding possible mistakes so that corrective action can be taken before the end of the semester.

Factor 12

46. Students are the most valuable resource of the university.

47. All university personnel are invaluable to the functions of the university and should be treated as such.

Factor 13

15. It is cheaper to spend more resources to do things right the first time, than to rush and later redo the defects.

16. There are students who graduate from this department without acquiring basic skills needed to perform a job in their field.

Factor 14

13. The university should periodically and systematically solicit feedback from employers of its graduates.

34. Evaluation methods that are based on the performance of the department as a whole, are preferable to those that reward individual performance.

Items included in factor one were intended to measure faculty attitudes toward Deming's point eight (Drive out fear). In this point, Deming contends that individuals within an organization should not be afraid to ask questions or take positions against those who have control over their position within the organization. The six items identified by this factor were all items that were intended to measure this point.

Items identified by factor two were developed to measure attitude toward Deming's point six (Institute training). According to Deming, training starts with thorough orientation of everyone within an organization and should continue as long as performance is not within statistical control.

The three items included in factor three were developed based on the concepts included in Deming's point one (Create constancy of purpose). Deming notes that no organization will survive unless it has a plan for the future. A living mission statement should detail the process needed to achieve quality and provide a vehicle for the organization to move toward the future.

Of the four items contained in factor four, items 48 and 49 were derived from Deming's point seven (Adopt and institute leadership). Deming states in this point that proper leadership

includes promoting teamwork and interrelationships, but performance evaluations destroy teamwork and promote individual success. Item 24 was intended to measure one aspect of point 11 (Eliminate numerical quotas) and item 40 was to measure part of point 10 (Eliminate slogans and exhortations).

Items in factor five were developed to measure some aspects of Deming's point 4, End the practice of awarding business on a price tag; point 12, Remove barriers to pride in workmanship; point 13, Institute a program of education; and point 14, Take action to accomplish the transformation. Items identified by this factor were not grouped as the researcher had intended. However, a closer examination of the items may yield other similarities either within or outside of the TQI principles; e.g. all the items deal with the value placed on students, faculty, and personnel.

Two items in factor six were addressing aspects of Deming's point six (Institute continuous training) and one item was toward point seven (Institute leadership). The three items, however, could be grouped in terms of the professional qualities of faculty. Factor seven included three items relating to Deming's point 9 (Promote and encourage teamwork). These three items were the only items that were intended to measure this point.

Five items were identified by factor eight. Item 19 and 20 were developed to measure two aspects of Deming's point three (Cease dependence on mass inspection). Items 21 and 22 were related to point four (End the practice of awarding business on a price tag) and item 25 was related to point 11 (Eliminate numerical quotas). The items that fell within this factor were developed so that they relate to three different points of Deming's theory. However, the collection of these items may be interpreted as the perceived value placed on the organizational standards.

Table 4.47. Means, Standard Deviations, Eigenvalues, Percent of Variation, and Reliability Coefficients for Factors 1 through 14

Factor	Mean	SD	Eigenvalue	Cumulative % of variation defined	Reliability (alpha)
Factor 1	25.43	3.11	5.70	12.7	.89
Factor 2	10.33	2.38	3.80	21.1	.68
Factor 3	10.16	2.53	3.01	27.8	.71
Factor 4	11.39	2.76	2.48	33.3	.60
Factor 5	19.00	2.72	1.88	37.5	.63
Factor 6	11.61	2.31	1.71	41.3	.66
Factor 7	11.06	2.10	1.56	44.7	.56
Factor 8	17.74	2.89	1.42	47.9	.56
Factor 9	11.06	2.07	1.33	50.8	.50
Factor 10	7.68	1.46	1.26	53.6	.41
Factor 11	6.54	1.71	1.22	56.3	.34
Factor 12	7.13	1.65	1.08	58.7	.28
Factor 13	7.36	1.45	1.07	61.1	.27
Factor 14	6.57	1.28	1.05	63.5	.13

The following analysis gives the results of testing hypotheses 2 through 7 on the 8 factors. Table 4.48 shows the comparison of the faculty respondents according to academic rank on each of the factors. The results indicated differences on three factors. On factor 2, full professors were significantly less favorable toward training than were associate and assistant professors. Analysis of factor 6 revealed that full professors differed significantly from associate professors on what constitutes a quality faculty. On factor 8, full professors differed from assistant professors regarding measures of quality.

Table 4.49 gives the comparison of the faculty across gender. Differences were indicated between males and females on three of the factors, 2, 7, and 8. Females exhibited the more favorable attitudes on factors 2 and 7 while males exhibited a significantly more favorable attitude on factor 8.

Table 4.48. Mean Scores, Standard Deviations, and F-values for Factors 1 through 8 on the TQIAS for Faculty by Academic Rank

	Full Professor			Assoc. Professor			Asst. Professor			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Factor 1	117	25.38	3.00	80	25.13	3.15	57	25.93	3.26	1.13	.32
Factor 2[1]	115	10.02[a]	2.24	78	10.24[b]	2.57	57	11.09[c]	2.23	4.04	.02*
Factor 3	118	9.99	2.41	82	10.30	2.42	59	10.29	2.91	.47	.63
Factor 4	117	11.15	2.73	80	11.86	2.92	56	11.23	2.52	1.74	.18
Factor 5	115	19.98	2.79	80	19.78	2.42	56	19.84	3.02	.15	.86
Factor 6[2]	117	11.18[d]	2.44	82	11.91[e]	2.05	57	12.04	2.28	3.78	.02*
Factor 7	118	10.95	2.28	80	10.91	2.20	57	11.49	1.89	1.46	.23
Factor 8[3]	117	17.31[f]	2.68	82	17.84	3.00	56	18.48[g]	3.05	3.26	.04*

[1]SNK's test: c is significantly different from a and b. Scheffe's test: c is significantly different from a.

[2]SNK's test: d is significantly different from e.

[3]SNK's and Scheffe's tests: f is significantly different from g.

*Significant difference at .05 level.

Table 4.49. Mean Scores, Standard Deviations, and T-values for Factors 1 through 8 on the TQIAS for Faculty By Gender

	Males			Females				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Factor 1	202	25.37	3.09	52	25.65	3.20	-.59	.55
Factor 2	198	10.14	2.38	52	11.08	2.22	-2.57	.01*
Factor 3	204	10.04	2.42	55	10.60	2.88	-1.48	.15
Factor 4	201	11.41	2.63	52	11.31	3.22	.24	.81
Factor 5	199	19.68	2.73	52	20.65	2.58	-2.31	.02
Factor 6	203	11.51	2.38	53	11.96	2.00	-1.28	.21
Factor 7	202	10.81	2.07	53	12.02	2.32	-3.70	.00*
Factor 8	202	17.49	2.88	53	18.68	2.70	-2.70	.01*

*Significant difference at .05 level.

Tables 4.50, and 4.51 show the comparison of the faculty on the factors across college of appointment. Differences among the groups are indicated on factors 2, 3, and 7. While the Library faculty are more favorable toward training than all other groups, statistically significant differences are only indicated with regard to the colleges of agriculture, engineering, and liberal arts and sciences. On factor three, the college of engineering differs significantly from liberal arts and sciences with regard to the attitudes toward aspects of the mission statement. Finally analysis of factor 7 reveals that the college of business has the least favorable attitude of all the colleges and differs significantly, in their attitude toward teamwork, from all colleges except the colleges of design and veterinary medicine and the library.

Analysis of the 8 factors across age revealed no significant differences among any of the age groups. The results are shown in Tables 4.52 and 4.53. Comparison of tenured and non-tenured faculty (Table 4.54) and comparison according to length of time as a faculty member (Table 4.55) indicated one difference among the groups on each comparison. On factor 1, non-tenured faculty were significantly more favorable toward speaking out without fear than tenured faculty. On factor five, respondents who had been faculty members for 10 or less years responded significantly less favorably than respondents who had been faculty members for a longer period of time.

Table 4.50. Mean Scores, Standard Deviations, and F-values for Factors 1 through 4 on the TQIAS for Faculty by College of Appointment

	Factor 1			Factor 2[1]			Factor 3[2]			Factor 4		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	26.00	2.83	8	12.75[a]	1.49	8	10.38	2.62	8	12.38	2.45
Agriculture	55	25.49	3.37	55	10.11[b]	2.35	55	9.78	2.67	53	10.79	2.73
Bus. Admin.	9	23.56	2.83	9	10.00	2.29	9	11.00	2.18	9	11.44	3.61
Design	10	25.10	3.93	9	10.78	3.19	10	10.30	2.00	10	10.30	1.83
Education	11	24.73	1.79	12	11.33	1.50	12	10.50	1.57	12	12.17	3.07
Engineering	36	25.22	3.23	38	10.16[c]	2.28	37	11.08[d]	1.75	38	11.63	2.85
Fam. & Con. Sci	15	25.87	2.95	15	11.53	2.26	15	10.87	2.50	15	11.27	3.15
Lib. Arts & Sci.	87	25.70	3.10	81	9.86[e]	2.39	90	9.46[f]	2.69	85	11.74	2.72
Veterinary Med.	18	24.72	2.61	18	10.78	2.16	18	11.11	2.76	18	11.11	2.47
F - Value		.78			2.53			2.35			.98	
F - Prob.		.63			.01*			.02*			.45	

[1]SNK's test: a is significantly different from b, c, and e. Scheffe's test: a is significantly different from e.
[2]SNK's test: d is significantly different from f.
*Significant difference at .01 level.

Table 4.51. Mean Scores, Standard Deviations, and F-values for Factors 5 through 8 on the TQIAS for Faculty by College of Appointment

	Factor 5			Factor 6			Factor 7[1]			Factor 8		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	7	19.14	2.61	8	12.75	1.58	8	11.38	2.26	7	19.57	1.27
Agriculture	54	19.56	2.76	54	11.20	2.61	55	11.11[a]	1.84	54	17.26	2.73
Bus. Admin.	9	20.22	1.72	9	10.22	2.91	9	9.00[b]	2.29	9	15.89	2.76
Design	10	19.80	1.81	10	12.00	1.25	9	11.67	2.18	10	18.60	2.76
Education	12	20.67	1.67	12	11.25	2.86	12	12.33[c]	2.06	12	18.33	3.03
Engineering	37	19.86	2.54	37	11.59	2.09	37	10.89[d]	2.42	38	17.66	3.03
Fam. & Con. Sci	15	20.93	2.28	15	12.60	1.88	15	12.13[e]	2.33	14	18.71	2.73
Lib. Arts & Sci.	85	19.88	2.89	88	11.52	2.28	88	10.88[f]	2.14	88	17.58	3.01
Veterinary Med.	18	19.94	3.57	18	12.67	1.61	17	11.29	2.14	18	18.67	2.30
F - Value		.59			1.81			2.29			1.69	
F - Prob.		.79			.08			.02*			.10	

[1]SNK's test: b is significantly different from a, c, d, e, and f.
*Significant difference at .05 level.

Table 4.52. Mean Scores, Standard Deviations, and F-values for Factors 1 through 4 on the TQIAS for Faculty by Age

	Factor 1			Factor 2			Factor 3			Factor 4		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	7	26.43	3.10	8	10.38	3.34	8	10.63	2.77	6	12.00	3.41
31 - 35	13	26.62	3.78	12	11.50	2.35	13	9.31	2.75	13	11.46	1.85
36 - 40	36	25.72	3.25	36	9.89	2.09	36	10.42	2.49	34	11.24	2.92
41 - 45	39	25.59	3.08	39	10.95	2.77	40	10.05	2.61	38	11.92	3.47
46 - 50	42	25.62	3.19	39	10.54	2.43	43	10.70	2.85	43	11.00	2.64
51 - 55	36	25.08	2.66	33	10.36	2.16	36	9.83	2.42	36	10.75	2.25
56 and over	81	24.99	3.12	83	9.95	2.20	83	10.05	2.33	83	11.64	2.66
F - Value		.88			1.56			.81			.88	
F - Prob.		.51			.16			.56			.51	

Table 4.53. Mean Scores, Standard Deviations, and F-values for Factors 5 through 8 on the TQIAS for Faculty by Age

	Factor 5			Factor 6			Factor 7			Factor 8		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	6	17.67	6.38	7	12.57	2.07	7	11.57	2.88	7	16.29	4.19
31 - 35	13	19.38	2.14	13	11.31	1.70	13	11.31	1.75	12	18.25	2.80
36 - 40	35	19.11	2.42	35	11.74	2.28	36	10.97	2.08	36	18.50	3.12
41 - 45	39	20.49	2.58	40	11.63	2.35	40	11.23	2.50	39	17.92	2.82
46 - 50	40	20.03	2.67	42	12.17	2.21	42	10.98	2.15	43	17.70	2.96
51 - 55	36	20.19	2.77	35	11.63	2.20	35	11.03	2.18	36	17.50	2.57
56 and over	82	19.96	2.54	84	11.21	2.48	82	10.99	2.13	82	17.49	2.82
F - Value		1.66			1.08			.16			.94	
F - Prob.		.13			.38			.99			.47	

Table 4.54. Mean Scores, Standard Deviations, and T-values for Factors 1 through 8 on the TQIAS for Faculty by Tenure

	Tenured			Not Tenured				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Factor 1	207	25.22	3.03	47	26.32	3.33	-2.20	.03*
Factor 2	203	10.20	2.37	47	10.91	2.38	-1.88	.06
Factor 3	210	10.14	2.50	49	10.22	2.69	-.20	.84
Factor 4	207	11.44	2.77	46	11.17	2.71	.59	.56
Factor 5	205	19.98	2.65	46	19.48	2.03	1.12	.26
Factor 6	209	11.57	2.33	47	11.74	2.27	-.46	.65
Factor 7	207	11.00	2.24	48	11.31	1.86	-.90	.37
Factor 8	209	17.65	2.85	46	18.13	3.10	-1.02	.31

*Significant at .05 level.

Table 4.55. Mean Scores, Standard Deviations, and F-values for Factors 1 through 8 on the TQIAS for Faculty by Length of Time as a Faculty Member in a Higher Education Institution

	10 years or less			11-20 years			Over 20 years			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Factor 1	66	25.70	3.57	82	25.73	2.78	104	25.02	3.03	1.56	.21
Factor 2	64	10.42	2.48	82	10.57	2.71	104	10.09	2.00	1.02	.36
Factor 3	68	10.07	2.74	83	10.47	2.55	108	9.97	2.37	.96	.38
Factor 4	65	11.55	2.73	81	11.60	3.18	107	11.13	2.41	.83	.44
Factor 5[1]	65	18.94[a]	2.83	81	20.41[b]	2.52	105	20.07[c]	2.68	5.88	.00*
Factor 6	66	11.48	2.27	83	11.90	2.09	107	11.45	2.50	1.03	.36
Factor 7	66	11.20	2.02	83	11.00	2.41	106	11.02	2.09	.18	.84
Factor 8	65	17.65	2.93	84	18.14	3.19	106	17.47	2.60	1.31	.27

[1]SNK's and Scheffe's tests: a is significantly different from b and c.
*Significant difference at .05 level.

Summary

This chapter presented the results of the reliability tests on the TQIAS and the findings of the analyses performed on data collected utilizing the TQIAS. It begins with the descriptive data regarding the two samples. Subsequently, the Chronbach's alpha estimates of reliability were computed for the two samples together and each sample separately for all the attitude items.

The null hypotheses were first analyzed on an item by item basis. In testing hypothesis I, the means responses of the faculty sample were compared with those of the DEO sample for each test item. Differences between the groups were indicated on six items. In four of the differences, faculty had a more favorable response as it applies to TQM than did DEOs.

Hypothesis II through VII compared subgroups of the sample of faculty. These subgroups included academic rank, gender, college of appointment, age range, tenure, and length of time as a faculty member in a higher education institution. The results of the analysis of these hypotheses is summarized as follows:

1. Significant differences were found in the mean responses of faculty on eight items across academic rank (Hypothesis II).
2. Significant differences were found in the mean responses of faculty on 16 items across gender (Hypothesis III).
3. Significant differences were found in the mean responses of faculty on thirteen items across college of appointment (Hypothesis IV).
4. A significant difference was found in the mean responses of faculty on one item across age ranges (Hypothesis V).

5. Significant differences were found in the mean responses of faculty on 10 items across tenure (Hypothesis VI).

6 Significant differences were found in the mean responses of faculty on seven items across length of time as a faculty member in a higher education institution (Hypothesis VII).

In the second part of the analysis, a factor analysis revealed 8 factors with relatively high reliabilities. Hypotheses II through IV were tested on these factors and the results were presented. Three significant differences were revealed across academic rank, gender, and college. There were no significant differences indicated when faculty subgroups were compared across age. Comparison across tenure and length of time as a faculty member showed one significant difference in each case.

CHAPTER V DISCUSSION

The primary purpose of this study was to assess attitudes of faculty and DEOs at Iowa State University toward issues identified in Deming's 14 principles of quality improvement, as they relate to the university setting. The major questions guiding this research were: Do DEOs have significantly different attitudes toward Deming's 14 principles than do faculty? Are there significant differences in the attitudes of faculty at Iowa State University toward Deming's 14 principles when the effects of the variables of academic rank, gender, college, age, tenure, and length of time as a faculty member in a higher education institution are considered? Based on the findings presented in Chapter IV, there are significant differences indicated between the two samples and within the faculty subgroups. A discussion of these differences follows.

The investigation in Chapter IV consisted of an item by item analysis and a factor analysis. The factor analysis revealed the existence of 14 factors with Eigenvalues greater than one that explain 63.5% of the total variation. For the purpose of this study, only factors one through eight, which have reliability coefficients greater than .50 were discussed and analyzed. This chapter presents a discussion of the analysis of each of the items and the factors. The chapter is organized into three sections. The first section provides a discussion of the comparison of faculty and DEOs on items of the TQIAS and of results of the item by item analysis and factor analysis performed on the faculty subgroups. The second section provides a brief conclusion and comments from the researcher and finally section three will present the recommendations for further study.

Factor Analysis and Item-by-Item Analysis Discussion

Comparison of the Two Samples

It was hypothesized that there would be no significant differences in mean responses to items 9A through 55 on the TQIAS between faculty and DEOs. The results of t-tests on each of these items indicated that the two groups did differ in their attitudes toward the following issues:

1. Students are graduating without acquiring basic skills needed in the job market (item 16). DEOs disagreed and faculty agreed with this statement.
2. Competition among faculty increasing the performance quality (item 36). Faculty disagreed and DEOs agreed with this statement.
3. Annual reviews rewarding only short term thinking (item 48).
4. The annual performance review as a good measure of the performance of personnel (item 49)
5. The university's use of resources to promote personal growth and development of non-faculty personnel (item 51)
6. The faculty and administration seeking different objectives with regard to the university (item 55). DEOs disagreed and faculty agreed with this statement.

The faculty indicated a more favorable response (as the items apply to these aspects of Deming's 14 principles) to items 16 and 36 than did the DEOs, but indicated a less favorable response to items 51 and 55. On items 48 and 49, significant differences were indicated between the groups, however, the mean response of both groups revealed an unfavorable attitude toward the items as they apply to Deming's principles.

Comparing Faculty Across Academic Rank

It was hypothesized that there would be no significant difference in attitude toward Deming's 14 principles when faculty were compared across academic rank. Results of the analysis on each of the items and on the eight factors revealed some significant differences. Faculty differed across academic rank on factors two, six, and eight and on several individual items. Factor two consists of three items that relate to the aspect of training. Full and associate professors were shown to have scored significantly less favorable on this factor than assistant professors. These items measured attitudes towards:

1. The need for personnel orientation programs to thoroughly orient new staff and faculty in the policies, procedure, and culture of the institution (item 31)
2. The need for ongoing training programs for each position within the university (item 30)
3. The need to orient all university personnel to the functions of all divisions within the university that can either affect or be affected by the performance of their department/unit (item 27)

On the analysis of individual items within this factor, assistant professors were found to be significantly more favorable (more favorable toward this aspect of Deming's principles) toward having on-going training programs (item 30) than were full and associate professors.

Factor six consists of three items that relate to the aspect of teaching quality. Full professors had a significantly less favorable score on this factor than associate professors. The items are:

1. Faculty with high credentials in their subject matter do not need training in pedagogical skills (item 28).
2. The best teachers are the ones who have high credentials in their field (item 29).
3. Teaching quality should be as important for promotion as the number of publications (item 50).

Of the items contained in factor six, analysis on the individual items revealed that full professors were significantly more agreeable with item 28 (less favorable toward this aspect of Deming's principles) than were assistant professors. They also were significantly more agreeable with item 29 (less favorable toward this aspect of Deming's principles) than were assistant or associate professors. The issue of teaching quality versus faculty scholarship was raised by Meyerson and Johnson (1991) as being one of the top public criticisms of higher education.

Factor eight consists of five items that relate to the concept of quality. Full professors had a significantly less favorable score than did assistant professors. The items are:

1. The major objective of tests is to distinguish the good students from the bad ones (item 19).
2. A good measure of controlling the quality of education is mass testing of graduates on state mandated exams (item 20).
3. Awarding contracts to the lowest bidder will help the university keep its costs down (item 21).
4. University purchasing policy should be determined more by the quality of the item than by price (item 22).
5. The best academic programs are those that have met the standards of the accreditation agencies (item 25).

Of the items contained in factor eight, analysis on individual items revealed that full professors were more agreeable with item 19 (less favorable toward this aspect of Deming's principles) than were assistant professors.

Additional items on which significant differences were indicated are:

1. Encouraging poorly performing students to study harder is seldom effective (item 40). Associate professors were significantly more agreeable (more favorable toward this aspect of Deming's principles) with the item than were full or assistant professors.
2. Budgets should be allocated to departments based entirely on student credit hours (item 43). Full professors were significantly less agreeable (more favorable toward this aspect of Deming's principles) with the item than were associate professors.
3. Basing scholarly growth on the number of publications reduces the quality of the research (item 44). Full professors were significantly less agreeable (less favorable toward Deming's principles) with the item than were associate professors.
4. How important is it for the university to meet the needs of the parents (item 9B). Full professors attached a higher degree of importance to meeting the needs of parents than did associate or assistant professors.

Although the above analysis hints that full professors as a group tend to be less favorable toward some aspects of Deming's 14 principles than the other academic ranks, all ranks scored favorably with regard to Deming's principles on the above factors and on the individual items contained within the factors. However, the mean responses of all groups on items 40 and 9B were unfavorable toward Deming's principles.

Comparing Faculty Across Gender

It was hypothesized that there would be no significant difference in attitude toward Deming's 14 principles when faculty was compared across gender. Results of the analysis on each of the items and on the eight factors revealed some significant differences. Significant differences in attitude were indicated between males and females on factors two, seven, and eight and on several individual items. Factor two consists of three items that relate to the aspect of training and measure attitude toward:

1. The need for personnel orientation programs that thoroughly orient new staff and faculty in the policies, procedure, and culture of the institution (item 31)
2. The need for ongoing training programs for each position within the university (item 30)
3. The need to orient all university personnel to the functions of all divisions within the university that can either affect or be affected by the performance of their department/unit (item 27).

Females were significantly more favorable toward training (more favorable toward Deming's principles) than were males. The item by item analysis indicated that of the items contained in factor two, females were significantly more agreeable with items 30 and 31 (more favorable toward this aspect of Deming's principles) than were males.

Factor seven consists of three items and measure attitude toward teamwork. The items are:

1 Generally it is not possible to apply teamwork in the classroom (item 35).

2. Competition among the faculty increases the quality of their performance (item 36).

3. Teamwork decreases the incentive of those who do outstanding work (item 37).

Males and females differed significantly on factor seven and on all three items contained within the factor. Females had a significantly higher factor score (more favorable toward this aspect of Deming's principles) than did males. Also, females were significantly less agreeable with all three items (more favorable toward this aspect of Deming's principles) than were males. Kaplan (1991) and Jorgensen (1992) state that one reason that TQI efforts are not taken seriously in higher education institutions is because the tenure and promotion process in these organizations tend to promote individual effort over team effort. In the discussion of comparison by college, differences in attitude toward teamwork will again be noted.

Factor eight consists of five items that relate to the concept of quality. Female professors had a significantly more favorable factor score than did male professors. The items in this factor are:

1. The major objective of tests is to distinguish the good students from the bad ones (item 19).
2. A good measure of controlling the quality of education is mass testing of graduates on state mandated exams (item 20).
3. Awarding contracts to the lowest bidder will help the university keep its costs down (item 21).
4. University purchasing policy should be determined more by the quality of the item than by price (item 22).
5. The best academic programs are those that have met the standards of the accreditation agencies (item 25).

The item by item analysis revealed that males and females differed on items 19 and 21. On both of these items, females were less agreeable with the item (more favorable toward Deming's principles) than were males.

The item by item analysis indicated that the most significant differences in faculty occurred across gender. Additional items not contained in the above factors for which significant differences were indicated are:

1. How important is it for the university to meet the needs of faculty (item 9H).
2. It is cheaper to spend more resources to do things right the first time than to rush and later redo the defects (item 15).
3. I'm always looking for new ways to improve my professional performance (item 26).
4. Asking faculty to lower the percentage of Ds and Fs in a course implies that it is the faculty's fault that the students fail (item 39).
5. Administrative appeal to improve the quality of education without providing the means to do so, is frustrating to faculty (item 41).
6. Basing scholarly growth on the number of publications reduces the quality of the research (item 44).
7. If the skills of personnel become obsolete, it is the responsibility of the university to reassign them to other positions (item 52B).
8. Talents and contributions of everyone in the system regardless of rank, seniority, and responsibility must be utilized to solve the problems (item 53).
9. Administration should encourage faculty improvement leave (item 54).

Although both genders were agreeable with the above items (favorable toward this aspect of Deming's principles), in each case, female faculty were found to be more agreeable with the item than were male faculty.

Comparing Faculty Across College

It was hypothesized that there would be no significant difference in attitudes when faculty were compared across college. Results of the item by item analysis and the factor analysis revealed some significant differences. Significant differences in attitudes were indicated across college on factors two, three, and seven and on several individual items. Factor two consists of three items that relate to the aspect of training and measure attitude toward:

1. The need for personnel orientation programs to thoroughly orient new staff and faculty in the policies, procedure, and culture of the institution (item 31)
2. The need for ongoing training programs for each position within the university (item 30)
3. The need to orient all university personnel to the functions of all divisions within the university that can either affect or be affected by the performance of their department/unit (item 27).

Library faculty had a significantly more favorable attitude toward training (more favorable toward this aspect of Deming's principles) than did the colleges of agriculture, engineering, and liberal arts and sciences. They responded more favorably to all of the above items than any other college, however, significant differences were indicated on items 27 and 31 only. The analysis revealed that library faculty were significantly more agreeable with item 27 than were the colleges of agriculture, liberal arts and sciences, and veterinary medicine. They

were also significantly more agreeable with item 31 than were agriculture and liberal arts and sciences.

Factor three consists of three items that relate to the mission statement.

1. Overall satisfaction of the users of the university/department services is an important issue that should be addressed in the mission statement (item 12).
2. A mission statement should clearly outline where the organization stands on every issue that is important to the long term existence of the organization (item 11).
3. The university, and all departments within it, should have a clearly stated mission statement.

Comparison across college showed that the college of liberal arts and sciences scored less favorable toward this factor than all other colleges, however, a significant difference was indicated only in comparison to the college of engineering. On the analysis of the individual items for this factor, significant differences were indicated on item 10 between the college of liberal arts and sciences (this college was the least favorable toward this item than all other colleges) and the colleges of agriculture, engineering, and veterinary medicine. It is worth noting that while no groups differed on item 11, the mean responses of all groups were unfavorable toward this item.

Factor seven consists of three items and measure attitude toward teamwork.

1. Generally it is not possible to apply teamwork in the classroom (item 35).
2. Competition among the faculty increases the quality of their performance (item 36).
3. Teamwork decreases the incentive of those who do outstanding work (item 37).

The college of business administration scored the least favorable on this factor and the differences between the college of business administration and all other colleges (not including

the library) were significant except with regard to the colleges of design and veterinary medicine. Although the factor scores of these two colleges were higher than some of the scores that were detected as significantly different, the sample sizes of these two groups are small, thus the groups were not indicated as significantly differing from the college of business administration. The analysis of individual items revealed that of all colleges, (excluding the library) the college of business administration was most agreeable with item 36 (less favorable toward this aspect of Deming's principles), however, significant differences were indicated only with regard to the colleges of agriculture, education, engineering, and family and consumer sciences. Analysis of responses to item 37 revealed that the college of business administration was significantly more agreeable (less favorable toward this aspect of Deming's principles) with this item than all other colleges (excluding the library). On both items, 36 and 37, the college of business administration is the only college with mean responses in the agreeable range. All other colleges had mean responses in the range of disagree.

Significant differences among colleges were also indicated on several items in addition to the items contained in the above factors.

1. How important is it to meet the needs of alumni/business and industry (items 9C and 9E). Faculty were mixed on the importance of meeting the needs of alumni. Liberal arts and sciences assigned a significantly less degree of importance to meeting the needs of alumni than did agriculture, engineering, and veterinary medicine. The colleges of design and education assigned less importance to meeting the needs of alumni than did the college of veterinary medicine. The college of liberal arts and sciences rated meeting the needs of business and industry significantly less important than did the colleges of agriculture and engineering.

2. The university should periodically and systematically solicit feedback from employers of its graduates (item 13). Liberal arts and sciences was visibly least agreeable with this item, (less favorable toward this aspect of Deming's principles) however, multiple comparisons tests indicated significant differences in regard to the colleges of agriculture, engineering, and family and consumer sciences.
3. It is cheaper to spend more resources to do things right the first time, than to rush and later redo the defects (item 15). The college of agriculture was visibly the least favorable (less favorable toward this aspect of Deming's principles) toward this item, however, it was significantly different from only the college of engineering.
4. Awarding contracts to the lowest bidder will help the university keep its costs down (item 21). While all colleges had mean responses in the range of disagree, the college of design was indicated as disagreeing more strongly with the item than was the college of agriculture.
5. The best teachers are the ones who have high credentials in their fields of study (item 29). The college of veterinary medicine evidently had the strongest disagreement with this item than any other college. Tests of multiple comparisons revealed significant differences between the veterinary medicine college and the colleges of agriculture and liberal arts and sciences.
6. Basing scholarly growth on the number of publications reduces the quality of the research (item 44). The mean responses of all groups were approximately the same; they tended to agree. A significant difference was revealed between the college of agriculture (they tended to agree less) and the college of engineering.

7. Administration should encourage faculty improvement leave (item 54). Most colleges agreed highly with this item, however the college of engineering agreed the least. Significant differences were indicated between the college of engineering and the colleges of liberal arts and sciences and veterinary medicine.

An additional element of consideration when the faculty is divided according to college of appointment, is the sample size. A few of the sample sizes were quite small whereas others were relatively large. When making comparisons across college of appointment, in some cases, it appeared quite likely that two groups differed significantly but the tests of multiple comparisons failed to indicate a significant difference. This is most likely due to the small sample sizes.

Comparing Faculty Across Age

It was hypothesized that there would be no significant difference in attitudes when faculty was compared across age. No significant differences were indicated as a result of the analysis of the eight factor scores. Only one significant difference was indicated as a result of the item by item analysis. On item 54 (Administration should encourage faculty improvement leave.) the 36 - 40 age group was less favorable toward faculty improvement leave than were faculty 41 and over.

Comparing Faculty Across Tenure

It was hypothesized that there would be no significant differences in attitudes when tenured faculty were compared with non-tenured faculty. Results of analysis on the factors and the individual items revealed significant differences between these two groups on factor one and

on several of the individual items. Factor one consists of 6 items that deal with the aspect of speaking out without fear toward authority. The items regard attitudes toward:

1. Students speaking out when they disagree with the professor (item 32A).
2. Students speaking out when they encounter mistakes (item 32B).
3. Students expressing their ideas about the way teaching should be done (item 32C).
4. Faculty expressing disagreement with administration (item 33A).
5. Faculty speaking out when they encounter mistakes of administration (item 33B).
6. Faculty expressing ideas regarding university operations (item 33C).

The analysis was conducted on an individual item basis and on the factor score. Overall, the faculty responses to these items were quite favorable. The non-tenured faculty were a bit more favorable toward this factor than the tenured faculty. The analysis on the individual items indicated that tenured and non-tenured faculty differed in their responses on three of the items in the factor, 32A, 32B, and 33A. In all three cases, non-tenured faculty were more favorable toward the item as it relates to Deming's points than were tenured faculty.

Significant differences between the two groups were also indicated on several items not contained in factor one.

1. How important is it for the university to meet the needs of the parents (item 9B). Both tenured and non-tenured faculty assigned a low degree of importance (unfavorable toward this aspect in Deming's principles) to meeting the needs of parents, non-tenured faculty rated it significantly less important than did tenured faculty.
2. The major objective of tests is to distinguish the good students from the bad ones (item 19). Both groups tended to disagree with this statement (favorable toward

Deming's principles) however, non-tenured faculty were significantly less agreeable with the item.

3. It is essential that the university have ongoing training programs for each position within the university (item 30). Non-tenured faculty were significantly less agreeable (unfavorable toward Deming's principles) with the item than were tenured faculty.
4. Generally, it is not possible to apply teamwork in the classroom (item 35). Non-tenured faculty were significantly less agreeable (more favorable toward Deming's principles) with the item.
5. Encouraging poorly performing students to study harder is seldom effective (item 40). Both groups disagreed with the item (unfavorable toward Deming's principles) however non-tenured faculty were significantly less agreeable than were tenured faculty.
6. Administrative appeal to improve the quality of education, without providing the means to do so, is frustrating to faculty (item 41). Both groups highly agreed with the item (favorable toward this aspect of Deming's principles) however, non-tenured faculty were indicated as significantly more agreeable.
7. Overall faculty and administration seek different objectives with regard to the university (item 55). Tenured faculty were significantly less agreeable than were non-tenured faculty.

Comparing Faculty Across Length of Time as a Faculty Member

It was hypothesized that there would be no significant differences in attitudes when faculty were compared across length of time as a faculty member in a higher education

institution. Results of analysis on the factors and the individual items revealed significant differences between these two groups on factor five and on several of the individual items. Factor five consists of five items that deal with constant improvement involving everyone.

1. The university is responsible for working closely with high schools and community colleges to ensure that incoming students are adequately prepared (item 23)
2. Faculty are the most valuable resources of the university (item 45)
3. If the skills of personnel become obsolete, it is the responsibility of the university to re-educate and retrain them (item 52A).
4. Talents and contributions of everyone in the system regardless of rank, seniority, and responsibility must be utilized to solve the problems (item 53).
5. Administration should encourage faculty improvement leave (item 55).

Respondents who had been faculty members for less than 10 years scored significantly lower on this factor than those who had been faculty members in a higher education institution for a longer period of time. The analysis on individual items indicated that there were significant differences on items 23, 45, and 54. In each case, faculty members for 10 years or less were significantly less agreeable with the item (less favorable toward Deming's principles) than were other faculty.

Analysis of items not contained in factor five also disclosed significant differences.

1. How important is it for the university to meet the needs of the parents (item 9B). Faculty members for 10 years or less assigned less importance to parents needs (less favorable toward Deming's principles) than other groups, however, no group rated it of high importance.

2. It is essential that the university have ongoing training programs for each position within the university (item 30). Faculty in the 10 years or less group were significantly more agreeable (more favorable toward Deming's principles) with this item than were the other two groups.
3. Budgets should be allocated to academic departments based entirely on student credit hours (item 43). Faculty members for over 20 years were more disagreeable with this item than faculty members for 11 - 20 years. All groups, however, responded in disagreement (more favorable toward Deming's principles) with the item.
4. Teaching quality should be as important for promotion as the number of publications (item 50). Faculty in the 10 years or less group were significantly less agreeable (less favorable toward Deming's principles) with this item than were the other two groups. As mentioned in the discussion of comparison across academic rank, the issue of teaching quality versus faculty scholarship was raised by Meyerson and Johnson (1991) as being one of the top public criticisms of higher education. The tendency of the fairly new faculty toward placing greater emphasis on research, may become an issue of greater importance as new faculty begin to replace retiring faculty.

Summarizing the overall differences across length of time as a faculty member in a higher education institution, of the seven significant differences on individual items, six of them were between faculty members for 10 years or less and the other two age groups. In all but one of these, faculty members for 10 years or less responded least favorably to these aspects of Deming's 14 principles.

Other Findings

There were no significant differences indicated on factor four across any of the faculty subgroups - academic rank, gender, college, age, tenure, and length of time as a faculty member - however, all scores for this factor were virtually unfavorable as it applies to aspects of Deming's principles. The only exceptions to this may be faculty within the library and the college of education. The factor score for these two groups was just a fraction over the mean which may indicate a little higher degree of favorableness toward Deming's ideas with regard to the performance factor. Factor four deals with the attitude toward elements of evaluating performance and contains the following items:

1. Placing emphasis on meeting standards and quotas keeps me from performing my best (item 24).
2. Encouraging poorly performing students to study harder is seldom effective (item 40).
3. Annual reviews only reward short term thinking (item 48).
4. The annual performance review is a good measure of the performance of employees (item 49).

With regard to items 9A through 9I, the overall mean responses of all respondents indicated that meeting the needs of parents, alumni, state and local government, business and industry, federal government, and other university offices were assigned a very low degree of importance compared to students, employers, and faculty. Customer identification and satisfaction was identified by Libemann (1993), and Yanckello & Flaherty (1993) as one of the barriers to implementing TQI in higher education. Coate (1992), Jorgensen (1992), Harris

(1993), and Sullivan and Siggins (1993) address the importance of meeting the needs of business and industry. Several corporations make large investments annually to educate, train and retrain employees in-house. If higher education institutions cannot meet the needs of these clients, they may be faced with a growing competition from industry that is willing to provide the needed education.

Meyerson and Johnson (1991) and Sullivan and Siggins (1993) speak to how the ability and willingness to meet the needs of parents, state government, and federal government may also have a notable impact on higher education institutions. Colleges and universities receive about 40% of their revenue from state sources and 10% from federal sources. In addition, parents are the most common source of tuition, and recent resistance among parents to pay continually rising tuition could impact on the ability of the institution to raise the necessary amount of funding. Linden (1992-93), in his model for meeting diverse customer needs in organizations that may have trouble defining their customers, states that the needs of clients (customers who pay) and consumers (those who use the service) should take priority over other types of customers.

The overall means of faculty, as a group, on the following items were also unfavorable toward these issues as they apply to Deming's principles.

1. A mission statement should clearly outline where the organization stands on every issue that is important to the long term existence of the organization (item 11). As a whole, faculty disagreed with this statement.
2. We need to accept that there will always be students that fail and drop out of the university (item 14). As a whole, faculty agreed with this statement.

3. Evaluation methods that are based on the performance of the department as a whole, are preferable to those that reward individual performance (item 34). Faculty, as a whole, disagreed with this statement.
4. Encouraging poorly performing students to study harder is seldom effective (item 40). As a whole, faculty disagreed with this statement.
5. Annual reviews only reward short term thinking (item 48). As a whole, faculty disagreed with this statement.
6. The annual performance review is a good measure of performance of the employees (item 49). As a whole, faculty agreed with this statement.
7. Overall, faculty and administration seek different objectives with regard to the university (item 55). Faculty, as a whole, agreed with this statement.

Conclusion

The introduction of TQI into American higher education is in its beginning stages. Whether or not higher education should accept this philosophy, or if accepted, can the theory be a panacea for the problems of higher education are issues that require a great deal of additional research. TQI is a philosophy that requires total transformation of the present culture of American colleges and universities, therefore, the subject demands the research of scholars from various disciplines within the system. Such research should include the experience of those institutions that have already adopted the philosophy. In addition, individuals' perceptions of TQI and their readiness in accepting the new culture should be investigated in institutions that are considering its implementation.

This study purported to investigate the attitude of faculty and DEOs at Iowa State University toward some aspects of TQI. Further, it was proposed to identify possible group differences between DEOs and faculty and between/among faculty subgroups. To achieve the objectives, an instrument was developed by the researcher based on some issues more often raised in the literature regarding TQI and higher education. The concepts covered by the instrument, although derived directly from the 14 points of Deming's theory, can be implicit of other ideas. The questionnaire, however, was not inclusive of all the possible issues within the TQI philosophy. Moreover, topics covered by TQI are not exclusive of many day to day issues encountered by both the faculty and DEOs. Some of the items in the questionnaire touched on points controversial to higher education even outside the domain of TQI e.g., teaching vs. research, testing, basing promotions on the number of publications, and performance reviews. These concepts are not new to the academic society. They have been debated for years and many educators have already formed opinions toward or against them.

Thus, rather than calculating a composite score from the sum of the responses of each individual, the results of this study were first reported on an item by item basis and then on factors extracted from the data. As a result of item by item analysis of the data, the findings of this study can be used both within and beyond the concept of TQI. Since many items reflect issues that are of concern to the educational community, findings of the study can be of value to faculty and administration, as well as other campus groups, particularly those that serve in a decision making capacity. The research yields information regarding the views of faculty toward some controversial topics that may be useful in evaluating programs, policies, goals, and priorities of the university. Nonetheless, to illustrate an overall picture of the faculty and DEOs responses, a composite score also was calculated from the mean of the responses to items 10

through 55. To determine this score, first the responses to the items on which a higher response indicated a lower attitude toward TQI were recoded. Then the mean of the means of the responses was calculated across the subgroups of this study. The results are depicted in Figures A.1 through A.3 in Appendix A.

The differences found between/among subgroups on some items and factors, although statistically significant, did not have a significant magnitude. As far as the results of this study indicate, overall, neither faculty nor DEOs are very enthused about TQI. A major principle in TQI is identifying the customers and working toward satisfying the needs of those customers. According to TQI principles an organization should work toward satisfying the needs of all its constituents that can play a critical role in its long term survival. In terms of satisfying the needs of university constituents, respondents had placed students first and faculty second (Figure A.4 in Appendix A). Generally, faculty placed very low importance on satisfying the needs of other university constituents.

Generally, both faculty and DEOs placed students as the least valuable resource of the university after faculty and all other university personnel. Faculty with more seniority placed more emphasis on the value of faculty than those with fewer years of service. With regard to mission statements, Deming suggests that an ideal mission statement should outline all issues important to the long term existence of the organization. Although a significant gender difference was observed, results of this study indicated that neither faculty nor DEOs thinks that the mission statement should be as detailed.

In TQI philosophy, testing is a means for preventing defects rather than identifying defects at the end of the process. Review of related literature suggests that grading on the curve is planning for some students to pass and some to fail (in Deming's terms planning for defects).

Overall, both faculty and DEOs failed to express a strong opinion either for or against this subject. In his philosophy, Deming asserts that we live in a society in which defects are commonly accepted as a necessary part of life and that this notion should be changed. Findings of this study revealed that, at least to the extent that these results can be inferred, the notion of commonly accepting defects is also apparent in higher education. Overall, the respondents agreed that there always will be students who fail or drop out of the university. Furthermore, the respondents did not agree with the notion that in their departments there are students who graduate without acquiring the basic skills to perform a job related to their field of study, a conclusion that is not corroborated by the literature.

In point five of his philosophy, Deming talks about constant improvement of production and service. He contends that management is obligated to continually look for ways to improve quality and reduce waste. This improvement cannot be limited to only one or a few sections of the organization and should include all departments and units. While continuous improvement is not that foreign to higher education, the faculty on average, except for those from the library, college of education, and college of family and consumer science, were not favorable toward the necessity for continuous training for positions within the university.

Regarding the benefits or pitfalls of competition, faculty generally were not in favor of the notion that competition increases the quality of their performance. DEOs, however, had a more favorable attitude toward competition. In comparing faculty across colleges, the only group that beheld more benefits in competition and significantly differed all other groups was the faculty from the college of business. The same was true with regard to teamwork. Most respondents moderately agreed that teamwork can be applied in the classroom. Again, the only exception was the college of business faculty for which the responses were significantly less favorable toward

teamwork. TQI philosophy promotes teamwork and maintains that competition within the same organization is counterproductive in the long run.

To successfully adopt TQI, an organization needs to change its culture. Literature suggests that those organizations that have attempted to adopt the theory hastily have abandoned it in the same manner. TQI can be an answer to the problems faced by higher education institutions, but its successful implementation requires that the present culture within the institution be transformed. In recent years, a few colleges and universities have implemented the TQI philosophy and some others are in the process of adopting it. Results reported by these institutions with regard to the success of the efforts are mixed. Many institutions that have undergone the necessary cultural change are reporting encouraging results.

Despite the fact that there is not, at this time, a widespread attempt at Iowa State University to implement the principles of TQI, some aspects of the theory are being experimented with in a few offices across the campus. Teams have reviewed and improved processes within the student affairs and business and finance divisions. The university has also formed a partnership with Texas Instruments to promote and share TQI methods. The objectives of this partnership, as expressed by the university, are to orient Iowa State University with the principles of TQI both in terms of the university as an employer and as an educator (Dolan, 1993). Whether these attempts result in a campus-wide implementation of TQM, or not, the findings of this research can be useful to decision makers by providing a better understanding of the campus culture and attitudes of campus subgroups.

Recommendations for Further Study

Based on the findings of this study, the following recommendations for further research are made.

1. Since no instrument was available to collect the data for this study, the instrument used was developed by the researcher. Due to restrictions on the length of the questionnaire, this instrument was not inclusive of all the aspects of Deming's theory. To have a more comprehensive understanding of the attitude of the educators toward Deming's principles, issues in some of his 14 points should be studied in more detail.
2. Only a few variables which may account for differences in faculty attitudes were investigated. This research also dealt only with the main effects. Further research regarding interaction effects of demographic variables and introduction of new variables may yield valuable results.
3. Further investigation of the DEO sample, as well as investigation of upper administration would indicate more about administration's attitudes toward Deming's principles.
4. There was little in the literature about the application of TQI in the classroom. Research into this area is justified, particularly since the literature noted that TQI was more successfully implemented on the administrative side than on the academic side.
5. Replicating the same research at other institutions or on a broader scale would enable comparisons to be made with groups from other institutions.

6. There are other campus groups whose attitudes are also important to successful implementation of TQI. It is warranted that research to investigate these attitudes be conducted.

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APPENDIX A

GRAPHS OF COMPOSITE MEAN SCORES OF FACULTY AND DEOs

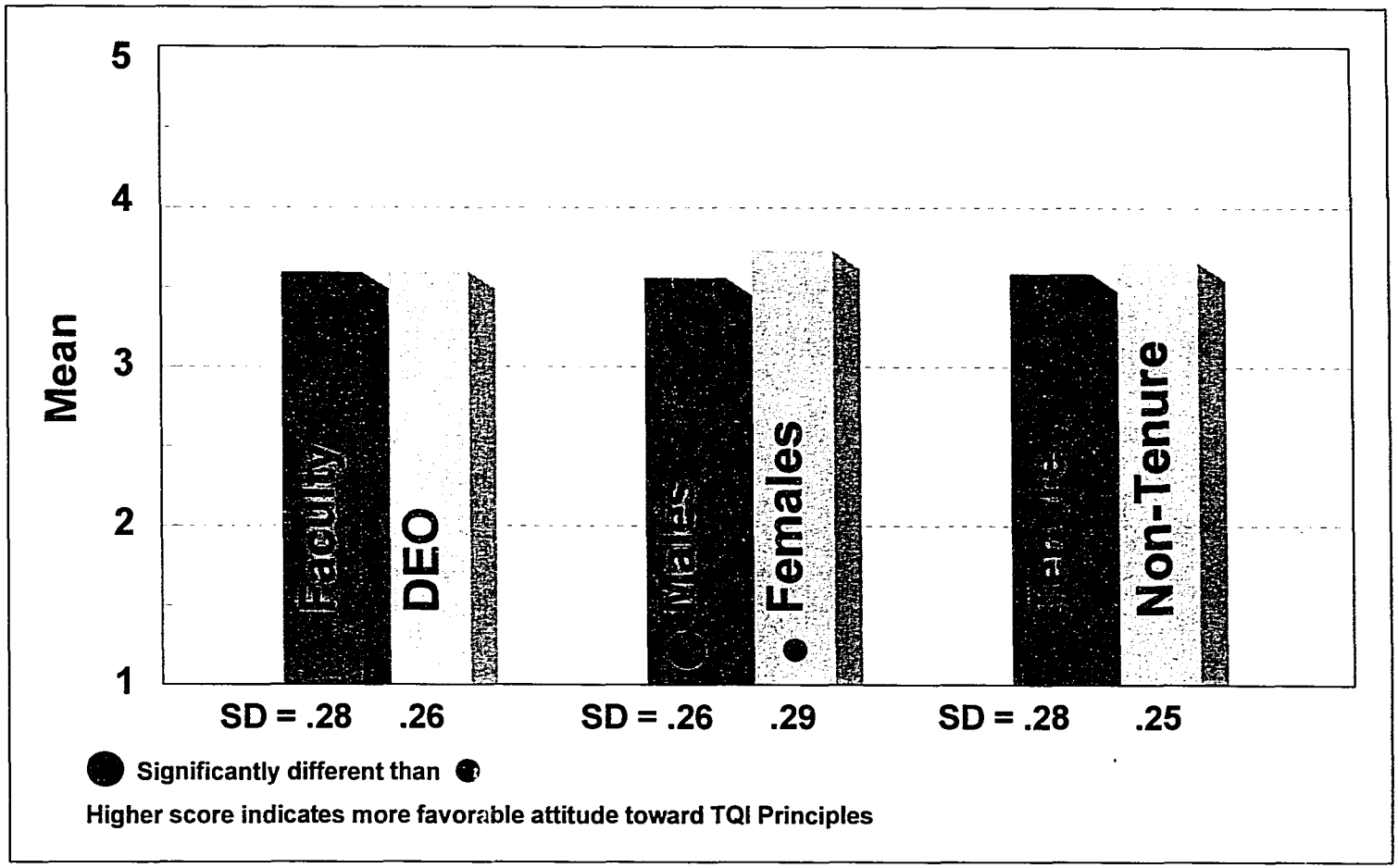

Figure A.1. Comparison of Faculty Across Administrative Appointment, Gender, and Tenure on Mean of all Responses.

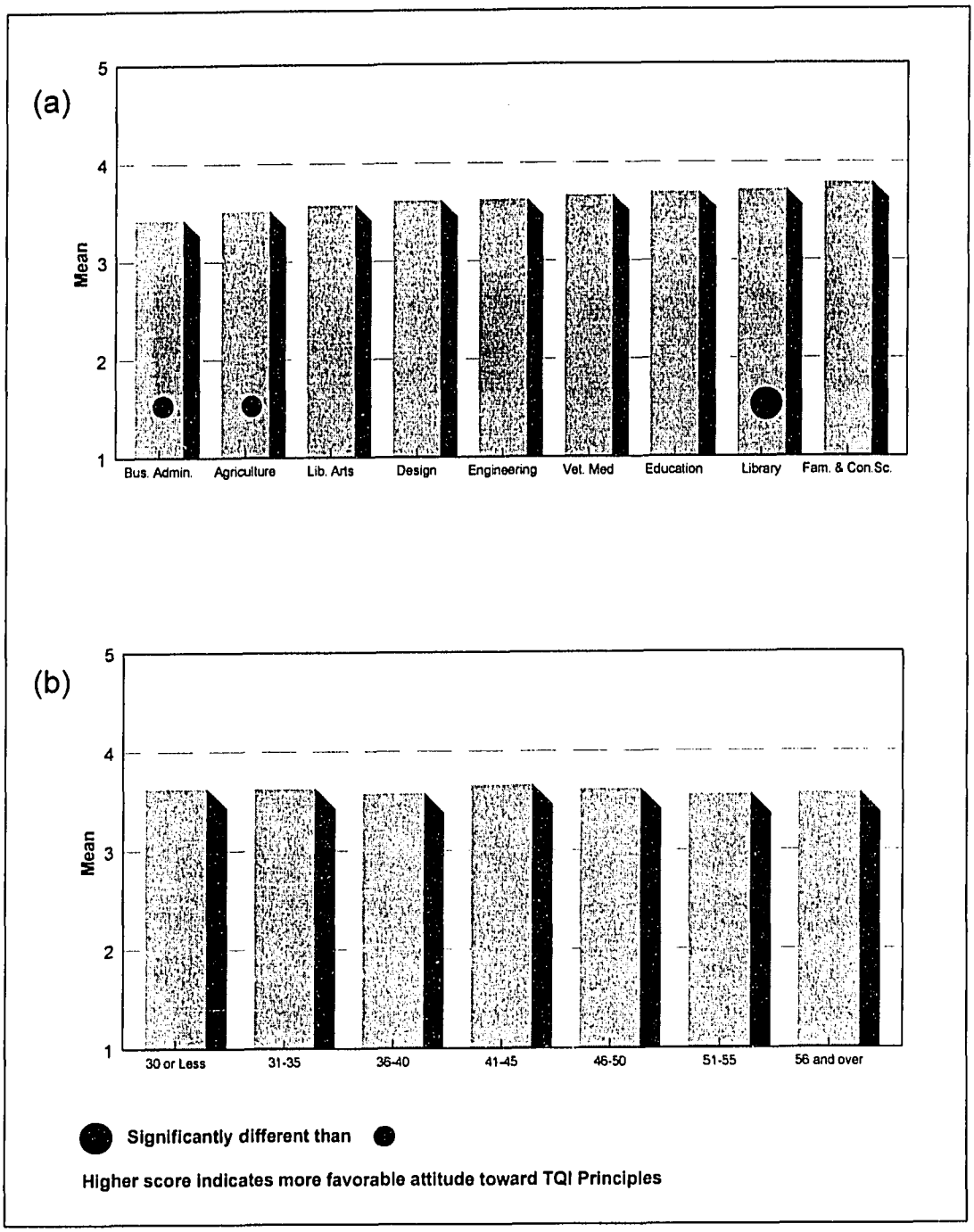

Figure A.2. Comparison of Faculty Across (a) College and (b) Age on Mean of all Responses.

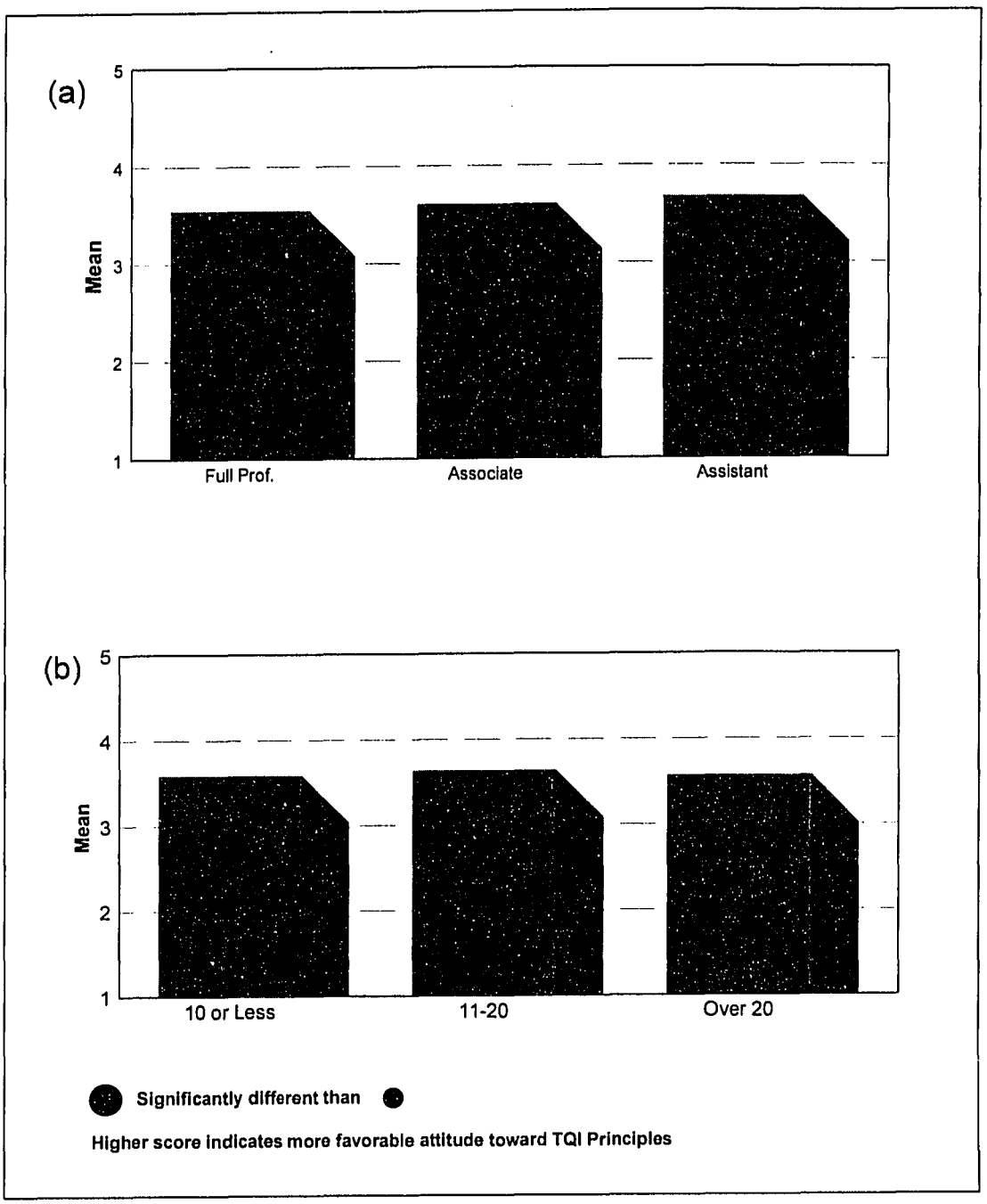

Figure A.3. Comparison of Faculty Across (a) Academic Rank and (b) Length of Time as a Faculty Member on Mean of all Responses.

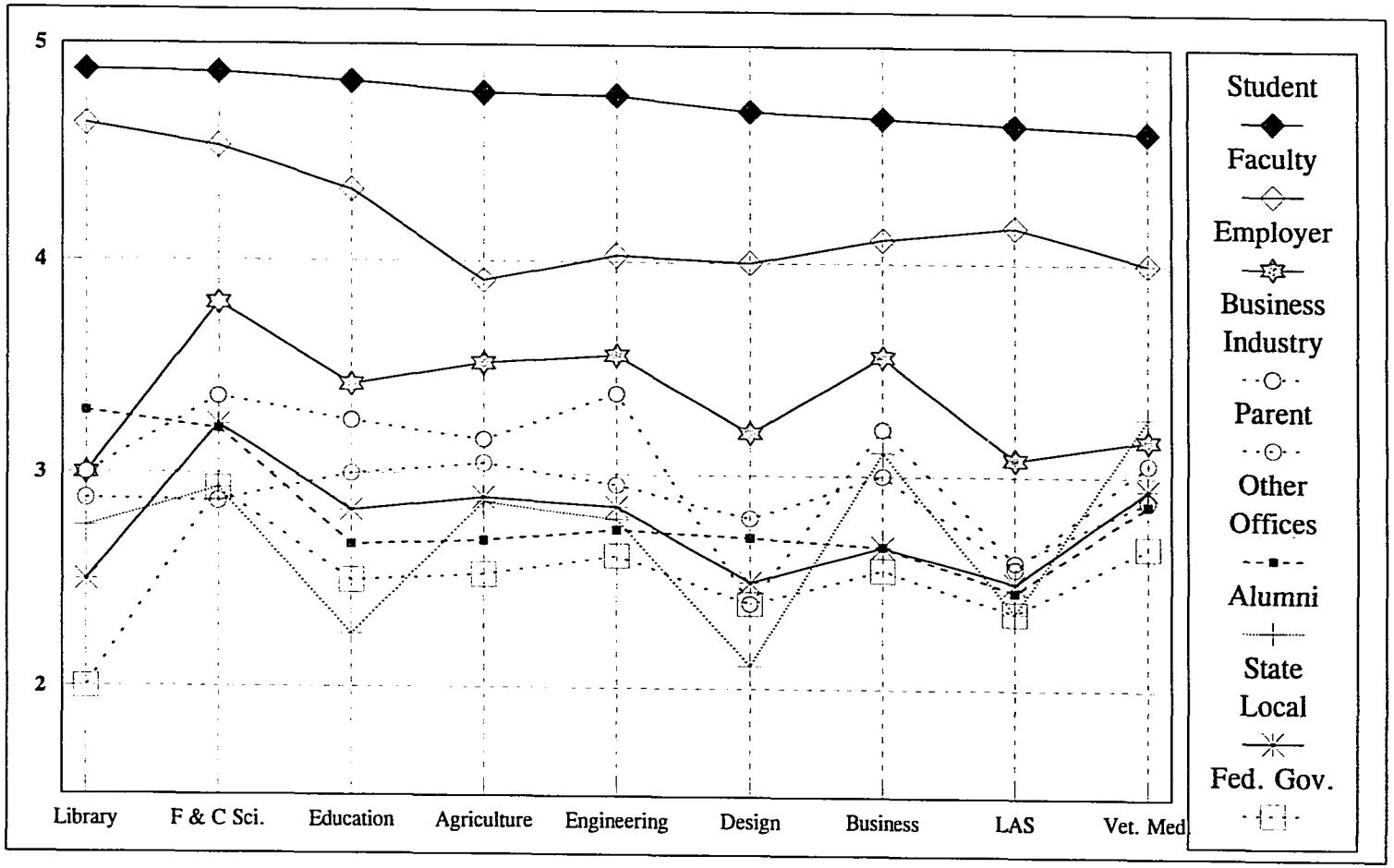

Figure A.4. Faculty's Perceived Importance Across College of Meeting the Needs of University Constituents.

APPENDIX B

MEAN SCORES, STANDARD DEVIATIONS, AND PEARSON PRODUCT-MOMENT CORRELATIONS FOR ALL ITEMS A COMBINED WEIGHTED SAMPLE OF FACULTY AND DEOs

Table B.1. Mean Score and Standard deviation of Itemss 9A Through 55 for the Combined Weighted Sample of Faculty and DEOs.

Variable	N	Mean	S. D.	Variable	N	Mean	S. D.
ITEM 9A	277	4.73	0.58	ITEM 31	279	3.61	1.04
ITEM 9B	274	2.88	0.97	ITEM 32A	275	4.21	0.67
ITEM 9C	275	2.69	0.94	ITEM 32B	276	4.31	0.58
ITEM 9D	276	3.38	1.01	ITEM 32C	275	3.87	0.89
ITEM 9E	275	2.99	0.96	ITEM 33A	278	4.37	0.55
ITEM 9F	275	2.77	0.95	ITEM 33B	277	4.41	0.53
ITEM 9G	276	2.53	0.89	ITEM 33C	278	4.29	0.57
ITEM 9H	276	4.12	0.88	ITEM 34	276	2.39	1.03
ITEM 9I	256	2.72	1.01	ITEM 35	275	3.87	0.94
ITEM 10	279	3.98	0.94	ITEM 36	278	3.40	1.12
ITEM 11	278	2.68	1.23	ITEM 37	278	3.77	0.90
ITEM 12	278	3.49	0.96	ITEM 38	273	3.70	0.96
ITEM 13	279	4.19	0.69	ITEM 39	274	3.29	1.04
ITEM 14	278	1.78	0.84	ITEM 40	278	2.70	0.95
ITEM 15	278	4.26	0.75	ITEM 41	277	4.28	0.82
ITEM 16	275	3.05	1.12	ITEM 42	277	3.85	1.00
ITEM 17	274	3.01	1.18	ITEM 43	278	4.03	0.87
ITEM 18	276	3.51	1.00	ITEM 44	277	3.48	1.06
ITEM 19	278	3.64	1.02	ITEM 45	275	4.01	1.00
ITEM 20	276	3.94	1.00	ITEM 46	272	3.47	1.08
ITEM 21	277	3.52	1.04	ITEM 47	275	3.71	1.09
ITEM 22	277	3.63	0.83	ITEM 48	277	2.74	1.07
ITEM 23	279	3.89	0.83	ITEM 49	276	2.97	1.01
ITEM 24	274	2.90	1.03	ITEM 50	276	4.06	1.03
ITEM 25	278	3.06	0.87	ITEM 51	275	3.7	0.95
ITEM 26	278	4.43	0.58	ITEM 52A	272	3.55	0.96
ITEM 27	269	3.53	0.90	ITEM 52B	269	3.2	1.00
ITEM 28	279	4.04	0.88	ITEM 53	276	4.19	0.75
ITEM 29	277	3.49	1.06	ITEM 54	277	4.26	0.67
ITEM 30	277	3.19	1.08	ITEM 55	277	2.66	1.13

Table B.2. Pearson Product-moment Correlation of Itemss 9A Through 55 for the Combined Weighted Sample of Faculty and DEOs.

Item	9A	9B	9C	9D	9E	9F	9G	9H	9I	10	11	12
9A	1.00	.24**	.23**	.27**	.11	.07	.03	.39**	.16**	.03	.09	.17**
9B	.24**	1.00	.52**	.28**	.27**	.34**	.26**	.17**	.32**	.20**	.06	.30**
9C	.23**	.52**	1.00	.38**	.38**	.46**	.43**	.25**	.45**	.27**	.27**	.36**
9D	.27**	.28**	.38**	1.00	.65**	.43**	.34**	.26**	.21**	.16**	.17**	.26**
9E	.11	.27**	.38**	.65**	1.00	.59**	.57**	.22**	.29**	.21**	.16**	.25**
9F	.07	.34**	.46**	.43**	.59**	1.00	.79**	.22**	.43**	.15*	.16**	.25**
9G	.03	.26**	.43**	.34**	.57**	.79**	1.00	.21**	.47**	.17**	.22**	.24**
9H	.39**	.17**	.25**	.26**	.22**	.22**	.21**	1.00	.43**	-.01	.09	.13*
9I	.16**	.32**	.45**	.21**	.29**	.43**	.47**	.43**	1.00	.27**	.24**	.29**
10	.03	.20**	.27**	.16**	.21**	.15*	.17**	-.01	.27**	1.00	.50**	.39**
11	.09	.06	.27**	.17**	.16**	.16**	.22**	.09	.24**	.50**	1.00	.45**
12	.17**	.30**	.36**	.26**	.25**	.25**	.24**	.13*	.29**	.39**	.45**	1.00
13	.00	.10	.24**	.37**	.34**	.17**	.16**	.02	.21**	.32**	.14*	.28**
14	.07	-.03	.05	-.06	.01	.01	.04	.09	.03	.01	.02	-.03
15	.20**	.06	.14*	.05	-.00	-.01	.06	.22**	.11	.16**	.17**	.21**
16	-.10	-.14*	.01	-.10	-.05	-.11	-.01	-.10	-.01	-.02	.03	.05
17	-.12*	-.03	-.00	-.03	-.02	-.02	.01	-.08	.02	.12	.14*	.07
18	.01	.04	.07	.04	-.03	.05	.06	-.02	.07	.19**	.14*	.21**
19	-.05	-.11	-.03	-.22**	-.10	-.11	-.09	.09	.08	-.01	-.11	-.03
20	-.03	.01	.01	-.12*	-.05	-.06	-.02	.08	.03	-.02	-.13*	-.18**

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	13	14	15	16	17	18	19	20	21	22	23	24
9A	.00	.07	.20**	-.10	-.12*	.01	-.05	-.03	.02	.11	.25**	-.09
9B	.10	-.03	.06	-.14*	-.03	.04	-.11	.01	.00	.04	.17**	-.13*
9C	.24**	.05	.14*	.01	-.00	.07	-.03	.01	.00	.15*	.14*	.02
9D	.37**	-.06	.05	-.10	-.03	.04	-.22**	-.12*	-.04	.00	.06	-.06
9E	.34**	.01	-.00	-.05	-.02	-.03	-.10	-.05	-.08	-.02	.05	.00
9F	.17**	.01	-.01	-.11	-.02	.05	-.11	-.06	-.08	-.07	.08	-.09
9G	.16**	.04	.06	-.01	.01	.06	-.09	-.02	-.09	-.05	.07	-.04
9H	.02	.09	.22**	-.10	-.08	-.02	.09	.08	.16*	.13*	.27**	.05
9I	.21**	.03	.11	-.01	.02	.07	.08	.03	.06	.16*	.20**	-.03
10	.32**	.01	.16**	-.02	.12	.19**	-.01	-.02	-.03	.12*	.17**	-.08
11	.14*	.02	.17**	.03	.14*	.14*	-.11	-.13*	.01	.15*	.12*	.02
12	.28**	-.03	.21**	.05	.07	.21**	-.03	-.18**	-.06	.14*	.13*	-.02
13	1.00	-.12*	.14*	.09	.04	.15*	-.03	-.03	-.06	.17**	.04	.06
14	-.12*	1.00	-.09	-.10	-.00	-.08	.16**	.17**	.06	.04	-.01	.15*
15	.14*	-.09	1.00	.17**	.19**	.09	.02	-.06	.12	.30**	.09	.12
16	.09	-.10	.17**	1.00	.06	.04	-.00	-.14*	.00	.01	-.07	.08
17	.04	-.00	.19**	.06	1.00	.20**	.06	.10	.08	.18**	.01	.21**
18	.15*	-.08	.09	.04	.20**	1.00	.03	-.08	-.02	.19**	.01	.12*
19	-.03	.16**	.02	-.00	.06	.03	1.00	.34**	.29**	.05	-.04	.03
20	-.03	.17**	-.06	-.14*	.10	-.08	.34**	1.00	.26**	.05	-.04	.04

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	25	26	27	28	29	30	31	32A	32B	32C	33A	33B
9A	.05	.20**	.06	.09	.10	.06	-.02	.14*	.17**	.10	.04	.11
9B	-.00	.08	.17**	.01	-.03	.05	.10	-.09	-.08	-.09	-.13*	-.09
9C	.00	.15*	.25**	.04	.09	.24**	.21**	.00	.05	.08	.01	-.01
9D	-.03	.14*	.08	-.05	.06	.14*	.06	.03	.09	.01	-.05	.01
9E	-.02	.11	.10	.05	.07	.20**	.06	.04	.09	.06	-.06	.02
9F	.03	.07	.11	-.03	-.02	.11	.10	.01	-.03	.01	-.09	-.06
9G	-.05	.11	.06	-.06	-.01	.11	.09	.01	.02	.03	-.04	-.03
9H	-.03	.24**	.09	.02	.04	.11	.17**	.10	.10	.10	.07	.15*
9I	.05	.12	.21**	.10	-.01	.21**	.16*	-.01	.02	.04	-.07	-.07
10	-.06	.13*	.22**	.12*	.07	.27**	.23**	-.05	.01	.01	-.09	-.06
11	-.11	.06	.22**	.00	.08	.26**	.24**	-.05	.01	-.03	-.03	.02
12	-.13*	.14*	.27**	.14*	.12*	.26**	.27**	-.03	.04	.00	-.10	-.02
13	-.07	.17**	.20**	.02	.04	.33**	.20**	.00	.09	-.02	.08	.13*
14	.13*	.05	.08	.10	.06	.12*	.01	-.04	-.01	.00	-.07	-.08
15	-.06	.27**	.08	.04	.13*	.21**	.15*	.05	.08	-.02	.13*	.14*
16	-.02	-.01	-.01	.05	-.02	.04	.08	.02	.00	-.01	.02	.02
17	.06	.12*	.06	.20**	.21**	.16**	.13*	.03	.05	.00	.12	.09
18	-.06	.12*	.08	.05	.11	.09	.07	-.00	.02	.07	.01	.08
19	.18**	.09	.02	.25**	.17**	.12*	.14*	.08	.08	.08	.10	.04
20	.27**	.11	-.08	.08	.08	.02	-.00	.03	.06	.05	.03	.05

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	33C	34	35	36	37	38	39	40	41	42	43	44
9A	.05	-.02	.09	.05	.02	.03	.00	.01	.11	.08	.08	.04
9B	-.06	-.06	.05	-.14*	.00	.06	-.07	-.04	-.04	-.01	-.04	-.09
9C	.01	-.01	.04	-.08	.05	-.06	-.17**	-.02	-.04	-.00	.06	-.02
9D	-.02	.03	.00	-.11	.08	.08	-.09	-.01	-.01	-.08	-.01	.08
9E	.01	.08	.07	-.11	.12	.03	-.17**	-.03	-.06	-.04	-.10	.04
9F	-.01	.08	.07	-.13*	.12	-.05	-.24**	-.06	-.07	-.02	-.02	-.06
9G	.01	.11	.01	-.09	.10	-.08	-.16**	.00	-.09	.01	-.04	.00
9H	.15*	.01	.09	.18**	.09	.00	-.03	.11	.21**	.19**	-.03	.11
9I	-.02	.10	.07	-.00	.10	-.00	-.18**	-.02	-.06	-.01	.05	.05
10	-.03	.02	.12*	-.10	.06	-.05	-.13*	-.16**	-.00	-.08	-.04	.00
11	.04	.10	-.10	-.07	-.01	-.14*	-.09	-.03	-.00	-.01	-.07	.11
12	-.06	.08	-.05	-.17**	-.04	-.14*	-.08	.02	-.01	.00	-.04	.06
13	.07	.08	.00	-.08	-.01	-.01	-.07	-.09	.00	-.05	-.02	.04
14	-.04	.08	.01	.06	.01	-.11	-.21**	.02	-.04	-.01	-.00	-.10
15	.11	.02	.05	.09	-.01	-.04	.17**	-.01	.18**	.19**	-.03	.25**
16	-.01	.10	-.04	.06	-.11	.04	.10	.07	.01	.07	-.13*	.08
17	.07	.12	.11	.06	.04	-.14*	.02	.12	.07	.12	-.13*	.16**
18	.03	.11	-.03	-.08	-.14*	-.21**	-.02	-.05	.10	.15*	.03	.03
19	.12*	.04	.18**	.38**	.22**	-.05	-.02	.08	.22**	.07	-.08	.05
20	.10	.03	.19**	.22**	.27**	.09	.04	-.03	.16**	-.02	.02	.01

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	45	46	47	48	49	50	51	52A	52B	53	54	55
9A	.08	.16**	.13*	-.04	-.09	.26**	-.00	.07	.07	.21**	-.01	-.03
9B	.12*	.17**	.09	-.14*	-.15*	.15*	-.07	-.01	-.01	.02	-.05	.22**
9C	.12*	.19**	.22**	-.09	-.16**	.14*	.07	.04	-.09	.13*	.01	.19**
9D	.10	.24**	.10	-.08	-.19**	.15*	.05	.07	-.00	.01	-.11	.17**
9E	.06	.22**	.11	-.06	-.14*	.16*	-.00	.00	-.12	-.02	-.13*	.18**
9F	-.05	.15*	.10	-.09	-.18**	.14*	.01	.02	-.10	.01	-.06	.23**
9G	.02	.17**	.09	-.04	-.13*	.05	.01	.04	-.04	.03	-.03	.19**
9H	.29**	.06	.15*	.01	-.14*	.13*	.10	.28**	.05	.19**	.20**	.07
9I	.05	.06	.27**	-.04	-.09	.15*	.21**	.06	-.09	.15*	.10	.23**
10	-.01	-.06	.09	-.17**	-.23**	.08	.14*	.07	-.14*	.12*	-.08	.19**
11	.03	.02	.15*	-.01	-.12*	.12*	-.01	.15*	.06	.19**	-.07	.07
12	.11	.04	.18**	.08	-.05	.15*	-.02	.14*	.09	.13*	-.14*	.15*
13	.02	-.02	.10	-.04	-.03	.04	.12*	.02	-.08	.11	-.01	.06
14	.04	.12	.13*	.05	.07	.08	.09	.08	-.11	.03	.08	.05
15	.22**	.05	.14*	.05	-.05	.10	-.03	.19**	.11	.28**	.12*	-.12
16	-.06	-.14*	-.02	.05	.12*	.00	-.03	-.06	.02	-.03	.04	-.19**
17	-.00	.03	.22**	.10	.06	.18**	.15*	.06	.02	.08	.11	-.11
18	-.04	-.03	.20**	.07	-.02	.08	.02	.09	.07	.15*	.04	-.07
19	-.08	-.09	.14*	.05	.17**	.07	.07	.05	-.09	.04	.05	-.01
20	.01	.05	-.04	-.09	.04	.09	.14*	-.02	-.04	.01	.22**	.02

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	9A	9B	9C	9D	9E	9F	9G	9H	9I	10	11	12
21	.02	.00	.00	-.04	-.08	-.08	-.09	.16*	.06	-.03	.01	-.06
22	.11	.04	.15*	.00	-.02	-.07	-.05	.13*	.16*	.12*	.15*	.14*
23	.25**	.17**	.14*	.06	.05	.08	.07	.27**	.20**	.17**	.12*	.13*
24	-.09	-.13*	.02	-.06	.00	-.09	-.04	.05	-.03	-.08	.02	-.02
25	.05	-.00	.00	-.03	-.02	.03	-.05	-.03	.05	-.06	-.11	-.13*
26	.20**	.08	.15*	.14*	.11	.07	.11	.24**	.12	.13*	.06	.14*
27	.06	.17**	.25**	.08	.10	.11	.06	.09	.21**	.22**	.22**	.27**
28	.09	.01	.04	-.05	.05	-.03	-.06	.02	.10	.12*	.00	.14*
29	.10	-.03	.09	.06	.07	-.02	-.01	.04	-.01	.07	.08	.12*
30	.06	.05	.24**	.14*	.20**	.11	.11	.11	.21**	.27**	.26**	.26**
31	-.02	.10	.21**	.06	.06	.10	.09	.17**	.16*	.23**	.24**	.27**
32A	.14*	-.09	.00	.03	.04	.01	.01	.10	-.01	-.05	-.05	-.03
32B	.17**	-.08	.05	.09	.09	-.03	.02	.10	.02	.01	.01	.04
32C	.10	-.09	.08	.01	.06	.01	.03	.10	.04	.01	-.03	.00
33A	.04	-.13*	.01	-.05	-.06	-.09	-.04	.07	-.07	-.09	-.03	-.10
33B	.11	-.09	-.01	.01	.02	-.06	-.03	.15*	-.07	-.06	.02	-.02
33C	.05	-.06	.01	-.02	.01	-.01	.01	.15*	-.02	-.03	.04	-.06
34	-.02	-.06	-.01	.03	.08	.08	.11	.01	.10	.02	.10	.08
35	.09	.05	.04	.00	.07	.07	.01	.09	.07	.12*	-.10	-.05
36	.05	-.14*	-.08	-.11	-.11	-.13*	-.09	.18**	-.00	-.10	-.07	-.17**

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	13	14	15	16	17	18	19	20	21	22	23	24
21	-.06	.06	.12	.00	.08	-.02	.29**	.26**	1.00	.31**	.04	.02
22	.17**	.04	.30**	.01	.18**	.19**	.05	.05	.31**	1.00	.14*	.04
23	.04	-.01	.09	-.07	.01	.01	-.04	-.04	.04	.14*	1.00	.03
24	.06	.15*	.12	.08	.21**	.12*	.03	.04	.02	.04	.03	1.00
25	-.07	.13*	-.06	-.02	.06	-.06	.18**	.27**	.25**	.10	-.02	-.00
26	.17**	.05	.27**	-.01	.12*	.12*	.09	.11	.11	.13*	.11	.13*
27	.20**	.08	.08	-.01	.06	.08	.02	-.08	-.02	.10	.09	.10
28	.02	.10	.04	.05	.20**	.05	.25**	.08	.22**	.14*	.08	.02
29	.04	.06	.13*	-.02	.21**	.11	.17**	.08	.28**	.19**	-.03	.11
30	.33**	.12*	.21**	.04	.16**	.09	.12*	.02	.15*	.23**	.06	.24**
31	.20**	.01	.15*	.08	.13*	.07	.14*	-.00	.16**	.13*	.19**	.16*
32A	.00	-.04	.05	.02	.03	-.00	.08	.03	.08	-.01	.04	.14*
32B	.09	-.01	.08	.00	.05	.02	.08	.06	.14*	.03	.01	.13*
32C	-.02	.00	-.02	-.01	.00	.07	.08	.05	.04	.03	.10	.12
33A	.08	-.07	.13*	.02	.12	.01	.10	.03	.12*	.10	.02	.19**
33B	.13*	-.08	.14*	.02	.09	.08	.04	.05	.15*	.14*	.08	.18**
33C	.07	-.04	.11	-.01	.07	.03	.12*	.10	.10	.09	.10	.16**
34	.08	.08	.02	.10	.12	.11	.04	.03	-.01	.06	-.01	.16**
35	.00	.01	.05	-.04	.11	-.03	.18**	.19**	.07	-.04	.06	-.08
36	-.08	.06	.09	.06	.06	-.08	.38**	.22**	.20**	.09	.07	.11

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	25	26	27	28	29	30	31	32A	32B	32C	33A	33B
21	.25**	.11	-.02	.22**	.28**	.15*	.16**	.08	.14*	.04	.12*	.15*
22	.10	.13*	.10	.14*	.19**	.23**	.13*	-.01	.03	.03	.10	.14*
23	-.02	.11	.09	.08	-.03	.06	.19**	.04	.01	.10	.02	.08
24	-.00	.13*	.10	.02	.11	.24**	.16*	.14*	.13*	.12	.19**	.18**
25	1.00	-.13*	-.08	.17**	.14*	.04	-.03	.01	.05	.09	.05	.02
26	-.13*	1.00	.11	.12*	.18**	.20**	.17**	.12*	.23**	.09	.18**	.28**
27	-.08	.11	1.00	.21**	.11	.39**	.34**	.01	-.01	.14*	.06	.04
28	.17**	.12*	.21**	1.00	.44**	.34**	.31**	.07	.09	.23**	.01	.04
29	.14*	.18**	.11	.44**	1.00	.34**	.17**	-.01	.02	.04	.05	.06
30	.04	.20**	.39**	.34**	.34**	1.00	.50**	.08	.12*	.18**	.12*	.10
31	-.03	.17**	.34**	.31**	.17**	.50**	1.00	.12*	.12*	.17**	.10	.13*
32A	.01	.12*	.01	.07	-.01	.08	.12*	1.00	.74**	.57**	.63**	.61**
32B	.05	.23**	-.01	.09	.02	.12*	.12*	.74**	1.00	.51**	.60**	.75**
32C	.09	.09	.14*	.23**	.04	.18**	.17**	.57**	.51**	1.00	.44**	.43**
33A	.05	.18**	.06	.01	.05	.12*	.10	.63**	.60**	.44**	1.00	.81**
33B	.02	.28**	.04	.04	.06	.10	.13*	.61**	.75**	.43**	.81**	1.00
33C	.09	.21**	.08	.04	.02	.10	.12*	.55**	.57**	.52**	.73**	.74**
34	-.06	-.04	.17**	.11	.13*	.23**	.13*	.10	.02	.02	.01	-.01
35	.13*	.08	-.05	.30**	.17**	.13*	.03	.09	.08	.15*	.00	.02
36	.11	.03	.01	.22**	.22**	.12*	.03	.15*	.05	.13*	.13*	.10

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	33C	34	35	36	37	38	39	40	41	42	43	44
21	.10	-.01	.07	.20**	.11	.05	.04	.07	.20**	.12*	-.01	.24**
22	.09	.06	-.04	.09	.05	-.04	.07	.02	.17**	.09	.07	.22**
23	.10	-.01	.06	.07	.08	.15*	.02	-.03	.07	.09	.09	.07
24	.16**	.16**	-.08	.11	-.05	-.17**	.04	.14*	.13*	.20**	-.04	.09
25	.09	-.06	.13*	.11	.10	-.02	-.10	-.02	.03	-.10	.04	-.06
26	.21**	-.04	.08	.03	.03	-.05	.06	.01	.25**	.10	-.06	.16**
27	.08	.17**	-.05	.01	-.02	-.15*	-.05	.05	.03	.01	.05	.11
28	.04	.11	.30**	.22**	.23**	-.13*	-.08	-.01	.12	.05	.02	.16**
29	.02	.13*	.17**	.22**	.23**	-.06	-.06	-.02	.17**	.11	-.06	.29**
30	.10	.23**	.13*	.12*	.11	-.13*	-.10	-.01	.23**	.15*	-.07	.21**
31	.12*	.13*	.03	.03	.05	-.08	.02	.01	.23**	.22**	-.05	.17**
32A	.55**	.10	.09	.15*	.09	.05	-.03	-.03	.14*	.10	.02	.08
32B	.57**	.02	.08	.05	.11	.11	.03	-.04	.07	.06	.11	.02
32C	.52**	.02	.15*	.13*	.15*	-.01	-.07	-.08	.07	.08	.15*	.00
33A	.73**	.01	.00	.13*	.06	.01	.09	.03	.17**	.17**	.12*	.10
33B	.74**	-.01	.02	.10	.08	.03	.06	-.02	.16**	.16**	.09	.16**
33C	1.00	-.03	.04	.12*	.13*	-.01	-.00	-.02	.09	.09	.11	.02
34	-.03	1.00	.10	.25**	.16**	-.08	-.11	.03	.03	.02	-.06	.07
35	.04	.10	1.00	.17**	.38**	.10	-.07	-.10	.08	-.01	.02	-.01
36	.12*	.25**	.17**	1.00	.37**	.06	.11	.16**	.16**	.17**	-.06	.23**

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	45	46	47	48	49	50	51	52A	52B	53	54	55
21	.01	-.00	.05	.02	.17**	.23**	.15*	.17**	-.07	.07	.09	-.09
22	.14*	.01	.17**	.07	-.02	.15*	.08	.18**	.05	.27**	.18**	-.09
23	.27**	.03	.16**	.04	-.15*	.08	.00	.20**	.12*	.27**	.15*	-.04
24	.19**	-.02	.14*	.25**	.19**	-.02	.01	.21**	.09	.19**	.14*	-.22**
25	-.15*	.03	.08	-.07	.09	.09	.20**	-.06	-.13*	-.03	.06	.01
26	.18**	.07	.18**	.02	-.05	.14*	.03	.07	.11	.25**	.15*	-.06
27	.04	-.00	.23**	.09	.04	.10	.13*	.10	-.01	.19**	-.04	-.00
28	-.07	-.00	.13*	.10	.09	.35**	.27**	.13*	-.03	.16**	.14*	-.02
29	.01	-.06	.05	.12*	.15*	.35**	.16**	.13*	-.04	.23**	.13*	-.17**
30	.08	.08	.22**	.13*	-.05	.25**	.19**	.39**	-.00	.35**	.06	-.02
31	.12*	.04	.23**	.06	-.05	.20**	.15*	.36**	.05	.34**	.19**	-.02
32A	.00	.08	.17**	.04	.05	.07	.03	.07	.04	.18**	.05	.00
32B	.05	.11	.11	-.08	.06	.03	.12	.07	.10	.15*	.03	.01
32C	-.10	.01	.09	-.01	.01	.10	.04	.07	.07	.10	.10	.03
33A	.07	.09	.16**	.05	.12*	.03	.04	.07	.10	.20**	.15*	-.12*
33B	.11	.09	.12	.03	.10	.06	.05	.09	.12*	.26**	.17**	-.13*
33C	.07	.06	.07	-.04	.03	.02	.00	.03	.09	.14*	.14*	-.06
34	.01	.04	.12	.13*	.10	.13*	-.07	.22**	.06	.15*	.11	-.05
35	-.15*	-.02	.09	-.14*	-.03	.18**	.22**	-.01	-.03	.17**	.10	.08
36	.03	-.11	.06	.22**	.25**	.15*	.07	.19**	.03	.16**	.17**	-.14*

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	9A	9B	9C	9D	9E	9F	9G	9H	9I	10	11	12
37	.02	.00	.05	.08	.12	.12	.10	.09	.10	.06	-.01	-.04
38	.03	.06	-.06	.08	.03	-.05	-.08	.00	-.00	-.05	-.14*	-.14*
39	.00	-.07	-.17**	-.09	-.17**	-.24**	-.16**	-.03	-.18**	-.13*	-.09	-.08
40	.01	-.04	-.02	-.01	-.03	-.06	.00	.11	-.02	-.16**	-.03	.02
41	.11	-.04	-.04	-.01	-.06	-.07	-.09	.21**	-.06	-.00	-.00	-.01
42	.08	-.01	-.00	-.08	-.04	-.02	.01	.19**	-.01	-.08	-.01	.00
43	.08	-.04	.06	-.01	-.10	-.02	-.04	-.03	.05	-.04	-.07	-.04
44	.04	-.09	-.02	.08	.04	-.06	.00	.11	.05	.00	.11	.06
45	.08	.12*	.12*	.10	.06	-.05	.02	.29**	.05	-.01	.03	.11
46	.16**	.17**	.19**	.24**	.22**	.15*	.17**	.06	.06	-.06	.02	.04
47	.13*	.09	.22**	.10	.11	.10	.09	.15*	.27**	.09	.15*	.18**
48	-.04	-.14*	-.09	-.08	-.06	-.09	-.04	.01	-.04	-.17**	-.01	.08
49	-.09	-.15*	-.16**	-.19**	-.14*	-.18**	-.13*	-.14*	-.09	-.23**	-.12*	-.05
50	.26**	.15*	.14*	.15*	.16*	.14*	.05	.13*	.15*	.08	.12*	.15*
51	-.00	-.07	.07	.05	-.00	.01	.01	.10	.21**	.14*	-.01	-.02
52A	.07	-.01	.04	.07	.00	.02	.04	.28**	.06	.07	.15*	.14*
52B	.07	-.01	-.09	-.00	-.12	-.10	-.04	.05	-.09	-.14*	.06	.09
53	.21**	.02	.13*	.01	-.02	.01	.03	.19**	.15*	.12*	.19**	.13*
54	-.01	-.05	.01	-.11	-.13*	-.06	-.03	.20**	.10	-.08	-.07	-.14*
55	-.03	.22**	.19**	.17**	.18**	.23**	.19**	.07	.23**	.19**	.07	.15*

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	13	14	15	16	17	18	19	20	21	22	23	24
37	-.01	.01	-.01	-.11	.04	-.14*	.22**	.27**	.11	.05	.08	-.05
38	-.01	-.11	-.04	.04	-.14*	-.21**	-.05	.09	.05	-.04	.15*	-.17**
39	-.07	-.21**	.17**	.10	.02	-.02	-.02	.04	.04	.07	.02	.04
40	-.09	.02	-.01	.07	.12	-.05	.08	-.03	.07	.02	-.03	.14*
41	.00	-.04	.18**	.01	.07	.10	.22**	.16**	.20**	.17**	.07	.13*
42	-.05	-.01	.19**	.07	.12	.15*	.07	-.02	.12*	.09	.09	.20**
43	-.02	-.00	-.03	-.13*	-.13*	.03	-.08	.02	-.01	.07	.09	-.04
44	.04	-.10	.25**	.08	.16**	.03	.05	.01	.24**	.22**	.07	.09
45	.02	.04	.22**	-.06	-.00	-.04	-.08	.01	.01	.14*	.27**	.19**
46	-.02	.12	.05	-.14*	.03	-.03	-.09	.05	-.00	.01	.03	-.02
47	.10	.13*	.14*	-.02	.22**	.20**	.14*	-.04	.05	.17**	.16**	.14*
48	-.04	.05	.05	.05	.10	.07	.05	-.09	.02	.07	.04	.25**
49	-.03	.07	-.05	.12*	.06	-.02	.17**	.04	.17**	-.02	-.15*	.19**
50	.04	.08	.10	.00	.18**	.08	.07	.09	.23**	.15*	.08	-.02
51	.12*	.09	-.03	-.03	.15*	.02	.07	.14*	.15*	.08	.00	.01
52A	.02	.08	.19**	-.06	.06	.09	.05	-.02	.17**	.18**	.20**	.21**
52B	-.08	-.11	.11	.02	.02	.07	-.09	-.04	-.07	.05	.12*	.09
53	.11	.03	.28**	-.03	.08	.15*	.04	.01	.07	.27**	.27**	.19**
54	-.01	.08	.12*	.04	.11	.04	.05	.22**	.09	.18**	.15*	.14*
55	.06	.05	-.12	-.19**	-.11	-.07	-.01	.02	-.09	-.09	-.04	-.22**

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	25	26	27	28	29	30	31	32A	32B	32C	33A	33B
37	.10	.03	-.02	.23**	.23**	.11	.05	.09	.11	.15*	.06	.08
38	-.02	-.05	-.15*	-.13*	-.06	-.13*	-.08	.05	.11	-.01	.01	.03
39	-.10	.06	-.05	-.08	-.06	-.10	.02	-.03	.03	-.07	.09	.06
40	-.02	.01	.05	-.01	-.02	-.01	.01	-.03	-.04	-.08	.03	-.02
41	.03	.25**	.03	.12	.17**	.23**	.23**	.14*	.07	.07	.17**	.16**
42	-.10	.10	.01	.05	.11	.15*	.22**	.10	.06	.08	.17**	.16**
43	.04	-.06	.05	.02	-.06	-.07	-.05	.02	.11	.15*	.12*	.09
44	-.06	.16**	.11	.16**	.29**	.21**	.17**	.08	.02	.00	.10	.16**
45	-.15*	.18**	.04	-.07	.01	.08	.12*	.00	.05	-.10	.07	.11
46	.03	.07	-.00	-.00	-.06	.08	.04	.08	.11	.01	.09	.09
47	.08	.18**	.23**	.13*	.05	.22**	.23**	.17**	.11	.09	.16**	.12
48	-.07	.02	.09	.10	.12*	.13*	.06	.04	-.08	-.01	.05	.03
49	.09	-.05	.04	.09	.15*	-.05	-.05	.05	.06	.01	.12*	.10
50	.09	.14*	.10	.35**	.35**	.25**	.20**	.07	.03	.10	.03	.06
51	.20**	.03	.13*	.27**	.16**	.19**	.15*	.03	.12	.04	.04	.05
52A	-.06	.07	.10	.13*	.13*	.39**	.36**	.07	.07	.07	.07	.09
52B	-.13*	.11	-.01	-.03	-.04	-.00	.05	.04	.10	.07	.10	.12*
53	-.03	.25**	.19**	.16**	.23**	.35**	.34**	.18**	.15*	.10	.20**	.26**
54	.06	.15*	-.04	.14*	.13*	.06	.19**	.05	.03	.10	.15*	.17**
55	.01	-.06	-.00	-.02	-.17**	-.02	-.02	.00	.01	.03	-.12*	-.13*

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	33C	34	35	36	37	38	39	40	41	42	43	44
37	.13*	.16**	.38**	.37**	1.00	.17**	-.07	-.08	.03	-.02	-.00	.05
38	-.01	-.08	.10	.06	.17**	1.00	.04	.05	.02	-.05	-.04	-.09
39	-.00	-.11	-.07	.11	-.07	.04	1.00	.06	.20**	.19**	.17**	.26**
40	-.02	.03	-.10	.16**	-.08	.05	.06	1.00	.05	.16**	-.07	.00
41	.09	.03	.08	.16**	.03	.02	.20**	.05	1.00	.42**	-.09	.29**
42	.09	.02	-.01	.17**	-.02	-.05	.19**	.16**	.42**	1.00	-.03	.23**
43	.11	-.06	.02	-.06	-.00	-.04	.17**	-.07	-.09	-.03	1.00	-.05
44	.02	.07	-.01	.23**	.05	-.09	.26**	.00	.29**	.23**	-.05	1.00
45	.07	.01	-.15*	.03	.06	.08	.09	.02	.19**	.21**	-.10	.08
46	.06	.04	-.02	-.11	-.05	-.05	-.11	-.10	-.03	-.03	-.01	.03
47	.07	.12	.09	.06	.08	-.11	-.08	.10	.11	.11	.07	.08
48	-.04	.13*	-.14*	.22**	-.04	-.09	.09	.27**	.19**	.21**	-.06	.27**
49	.03	.10	-.03	.25**	-.04	-.06	.19**	.26**	.10	.11	.03	.19**
50	.02	.13*	.18**	.15*	.26**	-.05	.05	-.16**	.22**	.17**	-.10	.36**
51	.00	-.07	.22**	.07	.17**	-.04	.08	-.02	.00	.08	.27**	.10
52A	.03	.22**	-.01	.19**	.15*	-.03	-.04	.05	.22**	.25**	-.05	.15*
52B	.09	.06	-.03	.03	-.06	-.05	.12*	.01	.08	.16**	-.07	-.01
53	.14*	.15*	.17**	.16**	.17**	-.03	.09	-.02	.30**	.28**	-.06	.20**
54	.14*	.11	.10	.17**	.10	.07	.07	.02	.24**	.16**	.03	.02
55	-.06	-.05	.08	-.14*	.12*	.09	-.24**	-.04	-.30**	-.22**	.04	-.28**

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.2. (Continued)

	45	46	47	48	49	50	51	52A	52B	53	54	55
37	.06	-.05	.08	-.04	-.04	.26**	.17**	.15*	-.06	.17**	.10	.12*
38	.08	-.05	-.11	-.09	-.06	-.05	-.04	-.03	-.05	-.03	.07	.09
39	.09	-.11	-.08	.09	.19**	.05	.08	-.04	.12*	.09	.07	-.24**
40	.02	-.10	.10	.27**	.26**	-.16**	-.02	.05	.01	-.02	.02	-.04
41	.19**	-.03	.11	.19**	.10	.22**	.00	.22**	.08	.30**	.24**	-.30**
42	.21**	-.03	.11	.21**	.11	.17**	.08	.25**	.16**	.28**	.16**	-.22**
43	-.10	-.01	.07	-.06	.03	-.10	.27**	-.05	-.07	-.06	.03	.04
44	.08	.03	.08	.27**	.19**	.36**	.10	.15*	-.01	.20**	.02	-.28**
45	1.00	.13*	.13*	.11	-.08	.06	-.06	.24**	.18**	.27**	.28**	-.11
46	.13*	1.00	.14*	-.08	-.09	.06	-.08	.05	.17**	.07	-.04	.07
47	.13*	.14*	1.00	.15*	-.00	.07	.19**	.30**	.04	.43**	.08	-.02
48	.11	-.08	.15*	1.00	.48**	.02	-.05	.21**	.10	.17**	.13*	-.25**
49	-.08	-.09	-.00	.48**	1.00	.07	.02	-.03	.02	-.02	.04	-.20**
50	.06	.06	.07	.02	.07	1.00	.11	.16**	-.02	.21**	.04	-.13*
51	-.06	-.08	.19**	-.05	.02	.11	1.00	.14*	-.15*	.22**	.09	.01
52A	.24**	.05	.30**	.21**	-.03	.16**	.14*	1.00	.25**	.39**	.22**	-.08
52B	.18**	.17**	.04	.10	.02	-.02	-.15*	.25**	1.00	.17**	.06	-.16*
53	.27**	.07	.43**	.17**	-.02	.21**	.22**	.39**	.17**	1.00	.33**	-.18**
54	.28**	-.04	.08	.13*	.04	.04	.09	.22**	.06	.33**	1.00	-.13*
55	-.11	.07	-.02	-.25**	-.20**	-.13*	.01	-.08	-.16*	-.18**	-.13*	1.00

*Signifcant < .05 (2-tailed)
**Significant < .01 (2-tailed)

Table B.3. Mean Scores, Standard Deviations, and F-values for Items 9A through 55 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Academic Rank

	Full Professor			Assoc. Professor			Asst. Professor			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 9											
Student	132	4.78	.53	84	4.69	.64	60	4.67	.60	1.05	.35
Parent[1]	132	3.02[a]	.92	83	2.92[b]	1.01	58	2.51[c]	.94	5.95	.00*
Alumni	131	2.77	.92	83	2.66	.98	60	2.57	.94	1.08	.34
Employers	131	3.38	1.04	84	3.39	.91	60	3.36	1.07	.01	.99
Business/Ind	132	3.04	.94	83	2.88	.96	59	3.05	1.02	.79	.45
Sta./Loc. Gov.	132	2.78	.97	83	2.82	.94	59	2.67	.94	.44	.64
Federal Gov.	132	2.50	.84	83	2.57	.95	60	2.53	.93	.14	.87
Faculty	132	4.10	.92	83	4.06	.88	60	4.23	.78	.71	.49
Other Offices	118	2.74	1.00	81	2.56	.99	55	2.78	1.08	.30	.74
Item 10	132	3.95	.90	86	4.05	.87	60	3.93	1.13	.40	.67
Item 11	132	2.62	1.23	85	2.74	1.22	60	2.76	1.27	.37	.69
Item 12	131	3.45	.91	86	3.46	.93	60	3.61	1.09	.61	.55
Item 13	132	4.20	.67	86	4.16	.68	60	4.19	.75	.08	.93
Item 14	132	1.81	.86	86	1.71	.85	59	1.84	.77	.57	.57
Item 15	132	4.16	.85	86	4.31	.62	59	4.39	.69	2.19	.11
Item 16	131	2.89	1.15	84	3.16	1.15	58	3.27	.96	2.85	.06
Item 17[2]	131	2.84[d]	1.14	83	3.24[e]	1.15	59	3.05	1.29	3.03	.05*
Item 18	131	3.40	.99	84	3.49	1.00	60	3.76	.98	2.67	.07
Item 19[3]	131	3.47[f]	1.05	86	3.65	1.05	60	3.98[g]	.83	5.42	.00*
Item 20	130	3.90	.92	86	3.97	1.05	59	3.97	1.12	.21	.81
Item 21	131	3.40	1.04	86	3.60	1.02	59	3.67	1.06	1.74	.18
Item 22	132	3.57	.85	86	3.61	.73	58	3.79	.91	1.50	.22
Item 23	132	3.96	.81	86	3.88	.83	60	3.75	.89	1.32	.27
Item 24	131	2.91	1.00	83	2.83	1.03	59	2.99	1.13	.43	.65
Item 25	132	3.06	.88	85	3.00	.94	60	3.14	.77	.43	.65
Item 26	132	4.37	.62	85	4.45	.53	60	4.53	.54	1.71	.18
Item 27	127	3.51	.89	82	3.52	.92	58	3.59	.90	.16	.85
Item 28[4]	132	3.92[h]	.89	86	4.08	.84	60	4.26[i]	.86	3.29	.04*
Item 29[5]	131	3.32[j]	1.15	85	3.57	.96	60	3.75[k]	.95	3.72	.03*
Item 30[6]	132	3.02[l]	1.05	84	3.17[m]	1.11	60	3.59[n]	.98	6.13	.00*
Item 31	132	3.52	.99	86	3.57	1.13	60	3.86	.97	2.27	.10
Item 32A	130	4.22	.62	86	4.12	.73	58	4.34	.69	1.85	.16
Item 32B	132	4.30	.53	83	4.24	.63	60	4.42	.62	1.72	.18
Item 32C	131	3.92	.91	84	3.77	.89	59	3.97	.85	.92	.40
Item 33A	132	4.37	.50	86	4.33	.61	59	4.42	.59	.48	.62
Item 33B	132	4.38	.50	84	4.41	.52	60	4.45	.59	.33	.72
Item 33C	132	4.25	.55	85	4.32	.58	60	4.35	.58	.84	.43
Item 34	131	2.39	1.09	85	2.35	1.01	59	2.45	.91	.18	.84
Item 35	131	3.84	.93	84	3.80	1.05	59	4.05	.75	1.50	.22

Table B.3. (Continued)

	Full Professor			Assoc. Professor			Asst. Professor			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 36	132	3.25	1.16	86	3.51	1.12	59	3.59	.96	2.56	.08
Item 37	132	3.81	.92	85	3.64	.89	60	3.88	.86	1.54	.22
Item 38	130	3.78	.92	84	3.71	.97	58	3.51	1.03	1.66	.19
Item 39	130	3.25	1.05	84	3.36	1.09	58	3.29	.99	.27	.76
Item 40[7]	132	2.59[o]	.86	86	2.97[p]	1.00	59	2.55[q]	1.02	5.25	.01*
Item 41[8]	132	4.18[r]	.86	85	4.30	.90	59	4.49[s]	.57	2.97	.05*
Item 42	132	3.78	.97	85	3.97	1.00	59	3.84	1.08	.93	.40
Item 43[9]	132	4.16[t]	.85	85	3.82[u]	.89	60	4.06	.86	4.18	.02*
Item 44[10]	132	3.30[v]	1.05	84	3.71[w]	.93	60	3.57	1.18	4.37	.01*
Item 45	130	4.08	1.02	86	3.98	.91	58	3.91	1.10	.66	.52
Item 46	129	3.49	1.09	83	3.43	1.00	59	3.47	1.17	.08	.93
Item 47	132	3.73	1.10	84	3.59	1.01	58	3.82	1.18	.81	.44
Item 48	131	2.62	1.08	85	2.88	1.05	60	2.78	1.07	1.53	.22
Item 49	132	2.88	1.02	85	3.11	1.00	58	2.95	1.00	1.38	.25
Item 50	131	3.98	1.07	86	4.22	.95	58	4.00	1.04	1.44	.24
Item 51	132	3.75	.89	86	3.62	1.05	56	3.71	.93	.50	.61
Item 52A	128	3.48	1.01	84	3.56	.86	58	3.69	.97	.91	.40
Item 52B	128	3.21	1.02	82	3.22	.96	57	3.12	1.04	.20	.82
Item 53	132	4.18	.81	85	4.19	.64	58	4.23	.77	.08	.92
Item 54	132	4.31	.66	86	4.24	.65	58	4.17	.73	.85	.43
Item 55	131	2.81	1.25	86	2.54	1.04	58	2.50	.94	2.19	.11

[1]SNK's and Scheffe's test: c is significantly different from a and b.
[2]SNK's: d is significantly different from e.
[3]SNK's: f is significantly different from g
[4]SNK's and Scheffe's test: h is significantly different from i.
[5]SNK's and Scheffe's test: j is significantly different from k.
[6]SNK's and Scheffe's test: n is significantly different from l and m.
[7]SNK's and Scheffe's test: p is significantly different from o and q.
[8]SNK's and Scheffe's test: r is significantly different from s.
[9]SNK's and Scheffe's test: t is significantly different from u.
[10]SNK's and Scheffe's test: v is significantly different from w.
*Significant difference at $\alpha = .05$ level.

Table B.4. Mean Scores, Standard Deviations, and T-values for Items 9 through 55 on the TQIAS for the Combined Weighted Sample of Faculty and DEOs By Gender

	Males			Females				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 9								
Student	220	4.71	.62	58	4.78	.42	-.76	.45
Parents	218	2.93	.96	57	2.70	.97	1.58	.11
Alumni	218	2.74	.97	58	2.53	.83	1.47	.14
Employers	220	3.39	.99	57	3.33	1.08	.41	.68
Sta/Loc. Gov.	220	3.02	.95	56	2.88	1.02	.93	.35
Bus./Ind.	220	2.80	.85	56	2.66	.97	.94	.35
Fed. Gov.	220	2.54	.89	57	2.48	.90	.40	.69
Faculty	219	4.01	.90	58	4.51	.62	-4.01	.00*
Other Offices	202	2.67	.98	54	2.90	1.11	-1.50	.14
Item 10	221	3.96	.92	59	4.07	1.04	-.82	.42
Item 11	220	2.61	1.20	58	2.97	1.32	-2.03	.04*
Item 12	220	3.48	.95	59	3.51	1.02	-.15	.88
Item 13	221	4.18	.68	59	4.19	.71	-.05	.96
Item 14	221	1.75	.79	58	1.91	.99	-1.28	.20
Item 15	221	4.19	.78	58	4.50	.58	-2.81	.01*
Item 16	219	3.06	1.09	57	3.00	1.25	.40	.69
Item 17	216	2.99	1.15	59	3.10	1.31	-.63	.53
Item 18	220	3.53	.96	57	3.40	1.14	.91	.36
Item 19	220	3.56	1.01	59	3.92	1.01	-2.40	.02*
Item 20	219	3.90	1.01	58	4.09	.98	-1.32	.19
Item 21	221	3.46	1.04	57	3.76	.99	-1.95	.05*
Item 22	220	3.58	.84	58	3.81	.80	-1.88	.06
Item 23	221	3.87	.81	59	3.97	.93	-.85	.39
Item 24	217	2.92	.99	58	2.84	1.20	.57	.57
Item 25	220	3.05	.91	59	3.09	.74	-.30	.76
Item 26	220	4.36	.59	59	4.67	.49	-3.56	.00*
Item 27	214	3.49	.91	56	3.66	.83	-1.21	.23
Item 28	221	4.01	.88	59	4.18	.85	-1.37	.17
Item 29	219	3.48	1.05	59	3.54	1.09	-.34	.74
Item 30	220	3.13	1.06	58	3.43	1.12	-1.90	.06
Item 31	221	3.53	1.04	59	3.92	.98	-2.62	.01*
Item 32A	219	4.21	.69	57	4.23	.61	-.18	.85
Item 32B	219	4.32	.58	58	4.26	.58	.64	.52
Item 32C	218	3.85	.92	58	3.97	.78	-.91	.36
Item 33A	221	4.36	.56	58	4.40	.53	-.52	.60
Item 33B	220	4.40	.53	58	4.42	.53	-.22	.83
Item 33C	220	4.26	.57	59	4.40	.53	-1.71	.09
Item 34	219	2.39	1.03	58	2.42	1.03	-.19	.85
Item 35	217	3.81	.96	59	4.09	.82	-2.06	.04*

Table B.4. (continued)

	Males			Females				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 36	221	3.28	1.11	58	3.86	1.04	-3.61	.00*
Item 37	221	3.72	.86	58	3.99	1.01	-2.09	.04*
Item 38	217	3.73	.92	57	3.60	1.10	.88	.38
Item 39	218	3.22	1.02	57	3.59	1.11	-2.45	.02*
Item 40	220	2.69	.92	59	2.71	1.08	-.15	.88
Item 41	220	4.20	.87	58	4.58	.53	-3.18	.00*
Item 42	220	3.80	1.00	58	4.05	.98	-1.69	.09
Item 43	220	4.04	.85	59	4.03	.98	.09	.95
Item 44	220	3.41	1.05	58	3.75	1.06	-2.21	.03*
Item 45	218	4.00	1.02	58	4.06	.94	-.37	.71
Item 46	215	3.48	1.06	58	3.42	1.13	.41	.68
Item 47	219	3.65	1.11	57	3.91	1.01	-1.60	.11
Item 48	220	2.74	1.02	58	2.71	1.27	.22	.82
Item 49	220	2.98	1.01	57	2.92	1.03	.34	.73
Item 50	220	4.03	1.07	57	4.18	.85	-1.01	.31
Item 51	220	3.66	.96	56	3.86	.90	-1.39	.17
Item 52A	216	3.50	.98	56	3.76	.85	-1.86	.06
Item 52B	213	3.14	1.01	56	3.42	.97	-1.85	.07
Item 53	220	4.13	.78	57	4.41	.56	-2.54	.01*
Item 54	221	4.21	.67	57	4.43	.66	-2.16	.03*
Item 55	221	2.64	1.13	57	2.73	1.16	-.52	.61

*Significant at .05 level.

Table B.5. Mean Scores, Standard Deviations, and F-values for Items 9A through 9E on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Student			Parent			Alumni[1]			Employer[2]			Bus./Ind.[3]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.88	.35	8	2.88	.83	8	2.75	.46	8	3.00	.93	8	3.00	.76
Agriculture	59	4.80	.61	59	3.11	1.04	59	2.95[a]	1.01	58	3.59[b]	1.08	59	3.22[c]	.98
Bus. Admin.	9	4.66	.50	9	3.08	.92	9	3.19	.68	9	3.58	.75	9	3.24	.75
Design	10	4.72	.47	10	2.79	.78	9	2.16	.79	10	3.14	.81	10	2.38[d]	.69
Education	12	4.84	.57	12	3.00	1.02	12	2.28	.96	12	3.40	1.30	12	3.24	1.19
Engineering	40	4.78	.48	39	2.96	.97	39	2.81[e]	.93	40	3.59	.89	40	3.38[f]	.85
Fam. & Con. Sci	16	4.88	.33	16	2.88	1.13	16	3.00[g]	.96	16	3.82	.91	15	3.33[h]	1.06
Lib. Arts & Sci.	94	4.64	.64	92	2.57	.86	94	2.35[i]	.84	94	3.09[j]	.99	93	2.58[k]	.86
Veterinary Med.	19	4.53	.77	19	3.02	.85	19	3.20[l]	.70	19	3.23	.73	19	2.98	.81
F - Value		.97			1.85	.96		4.68			2.34			4.89	
F - Prob.		.46			.07			.00*			.02*			.00*	

[1]SNK's test: i is significantly different from a, e, g, and l.
[2]SNK's test: b is significantly different from j.
[3]SNK's test: d is significantly different from c and f. k is significantly different from c, h, and f.
*Significant difference at .05 level.

Table B.6. Mean Scores, Standard Deviations, and F-values for Items 9F through 10 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	State/Loc.			Fed. Gov.			Faculty			Other Offices			Item 10[1]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	2.50	.53	8	2.00	.53	8	4.63	.52	7	3.29	1.25	8	4.00	.76
Agriculture	59	2.95	.99	59	2.58	.90	59	3.94	.99	58	2.74	1.10	59	4.03[a]	.94
Bus. Admin.	9	2.77	1.27	9	2.64	1.18	9	4.13	1.14	9	2.74	1.05	9	4.34	.50
Design	10	2.50	.70	10	2.41	.52	10	4.05	.69	7	2.80	.85	10	3.98	.88
Education	12	2.86	1.18	12	2.52	1.15	12	4.34	.77	12	2.70	.89	12	4.50[b]	.67
Engineering	40	2.85	.86	40	2.63	.93	40	4.03	.92	39	2.75	.94	40	4.13[c]	.80
Fam. & Con. Sci	14	3.20	.95	15	2.92	1.14	16	4.52	.63	15	3.29	.87	16	4.39[d]	1.07
Lib. Arts & Sci.	94	2.52	.89	94	2.37	.82	93	4.16	.80	84	2.47	.92	96	3.63[e]	.91
Veterinary Med.	19	2.87	.81	19	2.60	.71	19	3.94	.91	16	2.79	.99	19	4.33[f]	.95
F - Value		1.86			1.25			1.42			1.60			3.43	
F - Prob.		.07			.27			.19			.12			.00*	

[1]SNK's test: e is significantly different from a, b, c, d, and f.
* Significant difference at .05 level.

Table B.7. Mean Scores, Standard Deviations, and F-values for Items 11 through 15 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 11			Item 12			Item 13[1]			Item 14			Item 15[2]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	2.63	1.30	8	3.75	.71	8	4.25	.46	8	1.50	.53	8	4.13	.64
Agriculture	59	2.47	1.32	59	3.37	1.17	59	4.33[a]	.64	59	1.75	.84	59	3.99	.92
Bus. Admin.	9	2.73	1.27	9	3.87	.77	9	4.24	.45	9	1.76	.45	9	4.24	.66
Design	10	3.07	1.10	10	3.17	.65	10	4.07	.58	10	1.60	.52	10	4.33	.68
Education	12	2.42	.98	12	3.56	.81	12	4.50	.52	12	2.28	.98	12	4.60	.51
Engineering	39	3.05	1.04	39	3.72	.79	40	4.31[b]	.52	39	1.81	.93	39	4.43	.64
Fam. & Con. Sci	16	2.95	1.27	16	3.61	1.07	16	4.54[c]	.63	16	2.22	.99	16	4.40	.62
Lib. Arts & Sci.	95	2.52	1.23	96	6.32	.95	96	3.91[d]	.80	96	1.73	.86	96	4.24	.76
Veterinary Med.	19	2.96	1.34	19	3.68	.88	19	4.35	.61	19	1.68	.58	19	4.53	.51
F - Value		1.31			1.31			3.74			1.41	.84		2.01	
F - Prob.		.24			.24			.00*			.19			.05*	

[1]SNK's test: d is significantly different from a, b, and c.
[2]No two groups were found to be different.
*Significant difference at .05 level.

Table B.8. Mean Scores, Standard Deviations, and F-values for Items 16 through 20 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 16			Item 17			Item 18			Item 19			Item 20		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.25	1.39	8	2.75	1.28	7	3.57	.98	7	4.00	.58	7	4.29	.76
Agriculture	58	2.75	1.09	59	2.74	1.19	59	3.48	1.09	59	3.57	1.09	58	4.11	.96
Bus. Admin.	9	2.53	.97	9	2.00	.54	9	3.36	.79	9	2.73	.99	9	3.89	1.47
Design	9	3.29	1.30	10	3.02	1.35	9	3.78	.82	10	3.76	1.07	10	3.93	.98
Education	12	3.28	1.16	12	3.26	1.26	12	3.36	1.06	12	4.16	.70	12	4.32	.49
Engineering	39	3.18	.99	38	3.08	1.22	40	3.69	.89	40	3.63	.95	40	3.65	1.15
Fam. & Con. Sci	16	2.94	1.28	16	3.45	1.21	16	3.34	1.11	16	3.78	1.17	15	4.43	.51
Lib. Arts & Sci.	94	3.14	1.10	93	3.10	1.15	95	3.51	.98	96	3.63	.99	96	3.81	1.05
Veterinary Med.	19	3.22	1.17	19	3.24	1.17	19	3.36	1.16	19	3.69	1.09	19	4.08	.69
F - Value		1.16	1.12		1.85	1.19		.43			1.59	1.02		1.72	
F - Prob.		.32			.07			.90			.13			.09	

[1]SNK's test:
* Significant difference at .05 level.

Table B.9. Mean Scores, Standard Deviations, and F-values for Items 21 through 25 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 21[1]			Item 22			Item 23			Item 24			Item 25		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.00	.53	8	3.63	.52	8	4.13	.99	8	3.25	.71	8	3.25	1.04
Agriculture	59	3.19[a]	1.10	59	3.55	.79	59	3.93	.93	58	2.89	1.02	59	3.13	.93
Bus. Admin.	9	3.24	.95	9	3.11	.58	9	3.79	1.09	9	2.85	1.32	9	2.76	.82
Design	10	4.31[b]	.67	10	3.76	.72	10	3.74	.83	10	2.41	.83	10	3.05	1.05
Education	12	3.40	1.06	12	3.26	1.12	12	4.14	.59	12	2.82	1.10	12	3.18	.92
Engineering	39	3.72	.91	39	3.74	.75	40	4.07	.58	39	2.93	.93	40	2.96	.92
Fam. & Con. Sci	15	3.76	.95	16	3.66	.88	16	3.85	1.14	16	3.28	1.21	16	3.27	.77
Lib. Arts & Sci.	95	3.57	1.05	95	3.60	.82	96	3.84	.72	93	2.94	1.07	94	2.99	.80
Veterinary Med.	19	3.50	.97	19	4.08	1.05	19	3.51	1.22	19	2.76	1.04	19	3.22	.91
F - Value		2.32			1.71			1.07			.77			.60	
F - Prob.		.02*			.10			.39			.63			.78	

SNK's test: a is significantly different from b.
*Significant difference at .05 level.

Table B.10. Mean Scores, Standard Deviations, and F-values for Items 26 through 30 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 26			Item 27[1]			Item 28			Item 29[2]			Item 30[3]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.38	.52	8	4.50[a]	.53	8	4.63	.52	8	3.63	.92	8	3.63	.92
Agriculture	59	4.39	.56	59	3.46	.95	59	3.94	.87	58	3.33[b]	1.21	59	3.23	1.02
Bus. Admin.	9	4.55	.53	9	3.52	.72	9	3.66	.98	9	2.94[c]	1.14	9	3.06	1.11
Design	10	4.60	.52	9	3.55	1.10	10	4.14	.59	10	3.50	.93	9	3.64	1.15
Education	12	4.64	.50	12	3.44[d]	.52	12	4.00	.93	12	3.56	.78	12	3.60	.98
Engineering	40	4.38	.63	39	3.57[e]	1.02	40	3.85	.89	39	3.53	1.03	40	3.15	1.04
Fam. & Con. Sci	16	4.58	.51	16	3.89	.88	16	4.23	.97	16	3.88	1.08	16	3.72	1.00
Lib. Arts & Sci.	95	4.39	.62	87	3.39[f]	.83	96	4.09	.86	96	3.39[g]	.99	94	2.92	1.12
Veterinary Med.	19	4.45	.54	19	3.61[h]	.90	19	4.19	.97	19	4.26[i]	.86	19	3.53	.90
F - Value		.65			1.94	.90		1.24			2.29			2.18	
F - Prob.		.73			.05*			.28			.02*			.03*	

[1]SNK's test: a is significantly different from d, e, f, and h.
[2]SNK's test: i is significantly different from b, c, and g.
[3]No groups are found to be different.
* Significant difference at .05 level.

Table B.11. Mean Scores, Standard Deviations, and F-values for Items 31 through 33A on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 31[1]			Item 32A			Item 32B			Item 32C[2]			Item 33A		
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD
Library	8	4.63[a]	.52	8	4.25	.46	8	4.25	.46	8	4.38	.52	8	4.38	.52
Agriculture	59	3.45[b]	1.08	59	4.23	.67	59	4.28	.64	59	3.92	1.01	59	4.40	.53
Bus. Admin.	9	3.45	.99	9	4.03	.86	9	4.13	.36	9	3.29	.87	9	4.03	.86
Design	10	3.62	1.17	10	4.22	.78	10	4.22	.78	10	3.64	1.25	10	4.41	.52
Education	12	4.34	.49	12	4.24	.44	11	4.35	.50	12	3.50	.79	12	4.08	.50
Engineering	40	3.46[c]	.99	38	4.25	.68	39	4.37	.63	39	3.76	1.00	39	4.37	.59
Fam. & Con. Sci	16	3.97	1.09	16	4.34	.61	16	4.40	.51	16	4.19	.54	16	4.46	.51
Lib. Arts & Sci.	96	3.52[d]	1.03	94	4.23	.65	95	4.32	.56	93	3.99	.77	96	4.38	.53
Veterinary Med.	19	3.67	1.01	19	3.86	.83	19	4.17	.60	19	3.50	.91	19	4.37	.60
F - Value		2.51			.88			.43			2.23			.96	
F - Prob.		.01*			.54			.90			.03*			.47	

[1]SNK's test: a is significantly different from b, c, and d.
[2]SNK's test: No groups are found to be different.
*Significant difference at .05 level.

Table B.12. Mean Scores, Standard Deviations, and F-values for Items 33B through 36 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 33B			Item 33C			Item 34			Item 35			Item 36[1]		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	4.38	.52	8	4.38	.52	8	2.88	.99	8	3.88	.64	8	3.88	.83
Agriculture	59	4.39	.56	59	4.33	.54	59	2.19	.97	59	3.96	.80	59	3.27[a]	1.02
Bus. Admin.	9	4.13	.36	9	3.97	.51	9	1.87	.60	9	3.97	.86	9	2.37[b]	1.12
Design	10	4.50	.53	10	4.22	.78	10	2.81	1.13	10	3.86	.81	10	3.60	1.24
Education	11	4.26	.46	12	4.32	.49	12	2.78	1.34	12	4.00	1.25	12	4.24[c]	.94
Engineering	40	4.48	.55	40	4.24	.62	39	2.55	1.15	39	3.82	1.07	39	3.38	1.22
Fam. & Con. Sci	16	4.40	.51	16	4.37	.50	16	2.45	.98	16	4.19	.89	16	3.81[d]	1.28
Lib. Arts & Sci.	95	4.41	.52	95	4.29	.56	95	2.37	.95	93	3.74	1.02	95	3.42[e]	1.00
Veterinary Med.	19	4.37	.60	19	4.26	.58	18	2.34	1.12	18	3.95	.71	19	3.32	1.36
F - Value		.60			.54			1.42			.61			2.62	
F - Prob.		.78			.83			.19			.77			.01*	

[1]SNK's test:b is significantly different from a, c, d, and e.

* Significant difference at .05 level.

Table B.13. Mean Scores, Standard Deviations, and F-values for Items 37 through 41 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 37[1]			Item 38			Item 39			Item 40			Item 41		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.63	.92	8	3.50	1.20	8	3.63	1.06	8	3.13	.99	8	4.75	.46
Agriculture	59	3.97[a]	.74	57	3.66	.81	59	3.20	1.05	59	2.47	.90	59	4.11	.94
Bus. Admin.	9	2.66[b]	1.04	9	4.03	.71	9	3.03	.93	9	2.43	1.16	9	4.00	.97
Design	9	4.08[c]	.78	10	3.55	.87	10	3.14	.71	10	2.60	.52	10	4.22	.63
Education	12	4.04[d]	.83	12	3.96	1.06	12	2.82	1.24	12	3.32	1.07	12	4.48	.52
Engineering	40	3.60[e]	.89	39	3.78	1.09	39	3.36	1.10	40	2.65	.99	38	4.17	.79
Fam. & Con. Sci	16	4.06[f]	.77	16	3.27	1.06	16	3.46	1.02	16	2.55	.96	16	4.64	.49
Lib. Arts & Sci.	95	3.69[g]	.95	92	3.78	1.02	93	3.41	1.00	95	2.84	.95	96	4.39	.75
Veterinary Med.	19	4.05[h]	.70	19	3.55	.78	19	3.30	1.24	19	2.55	.91	19	4.27	.92
F - Value		3.51			.91			.81			1.80			1.73	
F - Prob.		.00*			.51			.60			.08			.09	

SNK's test: b is significantly different from a, c, d, e, f, g, and h.
*Significant difference at .05 level.

Table B.14. Mean Scores, Standard Deviations, and F-values for Items 42 through 46 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 42			Item 43			Item 44			Item 45			Item 46		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.50	.76	8	4.00	1.07	8	3.75	.46	7	3.14	.90	7	3.00	.82
Agriculture	59	3.67	1.05	59	4.21	.78	59	3.12	1.12	59	4.00	1.13	59	3.58	1.16
Bus. Admin.	9	3.82	1.08	9	3.81	.84	8	3.27	1.13	9	4.42	.58	8	3.50	1.16
Design	10	3.62	.97	10	3.79	.96	10	3.52	1.08	10	3.95	.76	9	3.69	.88
Education	12	3.98	.94	12	3.68	1.34	12	3.14	1.10	12	4.42	.78	12	3.52	1.24
Engineering	39	3.87	1.18	40	3.95	.67	40	3.72	1.04	39	4.10	.91	40	3.55	1.07
Fam. & Con. Sci	16	4.24	.93	16	4.21	.83	16	3.81	.98	16	1.13	.74	16	3.60	1.01
Lib. Arts & Sci.	95	3.99	.91	95	4.01	.96	95	3.54	1.01	94	3.97	1.00	92	3.30	1.05
Veterinary Med.	19	3.83	.95	19	4.15	.68	19	3.78	.85	19	3.82	1.09	19	3.45	1.07
F - Value		1.01			.92			1.92			1.70			.62	
F - Prob.		.43			.50			.06			.10			.76	

[1]SNK's test:
* Significant difference at .05 level.

Table B.15. Mean Scores, Standard Deviations, and F-values for Items 47 through 51 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 47			Item 48			Item 49			Item 50			Item 51		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.88	.99	8	2.88	.83	8	3.13	.99	8	4.50	.53	8	4.00	.53
Agriculture	59	3.59	1.16	58	2.50	1.13	59	2.75	1.01	59	4.05	1.09	59	3.72	1.01
Bus. Admin.	9	3.50	1.13	9	3.45	1.25	9	2.90	1.16	9	3.50	1.18	9	3.39	.75
Design	9	3.58	1.13	10	2.48	.70	10	2.76	.64	10	4.41	.52	10	3.83	.79
Education	12	3.92	.97	12	2.88	1.23	12	3.10	1.29	12	3.68	1.46	12	3.32	1.22
Engineering	39	3.77	1.02	40	2.81	1.05	39	3.11	1.13	39	4.16	.90	39	3.59	.83
Fam. & Con. Sci	16	4.34	.61	16	2.40	1.20	16	2.85	1.07	16	4.51	.80	16	4.13	1.07
Lib. Arts & Sci.	94	3.70	1.10	95	2.89	.99	94	3.04	.88	94	3.99	1.00	93	3.70	1.00
Veterinary Med.	19	3.33	1.33	19	2.68	1.21	19	3.22	1.26	19	4.22	.97	19	3.91	.74
F - Value		1.24			1.46			.76			1.53			1.12	
F - Prob.		.28			.17			.64			.15			.35	

SNK's and Scheffe's tests:
*Significant difference at .05 level.

Table B.16. Mean Scores, Standard Deviations, and F-values for Items 52A through 55 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by College of Appointment

	Item 52A			Item 52B			Item 53			Item 54			Item 55		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Library	8	3.63	.74	8	2.50	.76	8	4.13	.83	8	4.38	.74	8	2.38	.92
Agriculture	59	3.37	1.04	59	3.15	1.04	58	4.07	.85	59	4.30	.56	59	2.78	1.24
Bus. Admin.	9	3.71	.87	9	3.45	.99	9	4.24	.45	9	4.13	.36	9	3.02	1.38
Design	10	3.64	.72	10	3.33	.97	10	4.52	.52	10	4.12	.86	10	2.76	1.19
Education	12	3.56	1.24	12	2.98	1.03	12	4.08	.28	12	4.38	.69	12	2.68	1.29
Engineering	38	3.50	.92	38	3.17	1.08	39	4.23	.60	39	3.96	.62	39	2.64	1.18
Fam. & Con. Sci	16	3.82	.75	16	3.21	.95	16	4.49	.52	16	4.40	.71	16	2.84	1.12
Lib. Arts & Sci.	92	3.64	.91	88	3.28	.92	95	4.14	.80	95	4.29	.69	94	2.50	1.03
Veterinary Med.	18	3.55	1.16	19	3.32	1.19	19	4.32	.94	19	4.42	.76	19	2.68	1.14
F - Value		.60			.79	1.00		1.00			1.55			.55	
F - Prob.		.78			.61			.44			.14			.82	

[1]SNK's test:
* Significant difference at .05 level.

Table B.17. Mean Scores, Standard Deviations, and F-values for Items 9A through 9E on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Student			Parent			Alumni			Employer			Bus/Ind.		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	4.88	.35	7	2.14	1.07	8	2.63	.92	8	4.00	.93	8	3.75	1.04
31 - 35	13	4.70	.48	13	2.55	.77	13	2.53	.77	13	3.62	.86	12	3.30	.53
36 - 40	36	4.69	.52	36	2.64	.89	36	2.69	.92	35	6.30	.87	36	2.88	1.00
41 - 45	40	4.69	.61	40	2.74	1.04	40	2.53	.86	40	3.23	.99	40	2.78	.84
46 - 50	49	4.69	.68	48	3.06	.97	49	2.78	1.09	49	3.31	1.22	49	2.98	1.06
51 - 55	40	4.73	.75	40	3.12	.91	40	2.80	.91	40	3.35	1.10	40	2.99	.93
56 and over	89	4.77	.47	88	2.95	.96	87	2.71	.96	89	3.43	.91	88	3.02	.98
F - Value		.24			2.26			.44			.89			1.47	
F - Prob.		.96			.04*			.85			.50			.19	

*Significant difference at .05 level.

Table B.18. Mean Scores, Standard Deviations, and F-values for Items 9F through 10 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	State/Local Gov.			Fed. Gov.			Faculty			Other Offices			Item 10		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	3.00	.76	8	3.00	.76	8	4.50	.53	7	3.29	1.38	8	3.88	1.25
31 - 35	13	2.66	.88	13	2.51	.90	13	4.24	.88	13	2.53	1.19	13	3.62	.86
36 - 40	36	2.59	.74	36	2.37	.69	36	4.01	.93	35	2.53	.97	36	4.13	.88
41 - 45	40	2.80	.96	40	2.48	.89	40	3.91	.92	37	2.85	1.17	41	4.05	.97
46 - 50	49	2.67	.99	49	2.44	.87	49	4.23	.86	45	2.79	.99	49	4.17	.96
51 - 55	40	2.88	1.03	40	2.54	.93	40	4.06	.94	37	2.74	.95	41	3.98	1.01
56 and over	87	2.83	1.00	88	2.61	.98	88	4.15	.83	80	2.67	.93	89	3.85	.90
F - Value		.55	.95		.79			.95			.82			1.15	
F - Prob.		.77			.58			.46			.55			.33	

Table B.19. Mean Scores, Standard Deviations, and F-values for Items 11 through 15 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 11			Ietm 12			Item 13			Item 14			Item 15		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	2.75	1.39	8	4.00	.76	8	4.25	.46	7	1.57	.53	7	4.14	.90
31 - 35	13	2.47	1.12	13	3.27	1.18	13	4.15	.37	13	1.87	.90	13	4.53	.66
36 - 40	36	2.79	1.25	36	3.49	.97	36	4.24	.70	36	1.91	.92	36	4.43	.60
41 - 45	41	2.63	1.37	41	3.32	.94	41	4.29	.63	41	1.78	.96	41	4.25	.59
46 - 50	49	2.88	1.29	49	3.61	.96	49	4.11	.86	49	1.83	.94	49	4.25	.84
51 - 55	40	2.40	1.14	41	3.51	1.00	41	4.16	.68	41	1.74	.73	41	4.11	.97
56 and over	88	2.72	1.17	88	3.47	.93	89	4.17	.68	89	1.73	.74	89	4.24	.71
F - Value		.69			.83			.34			.34			.88	
F - Prob.		.66			.55			.91			.92			.51	

Table B.20. Mean Scores, Standard Deviations, and F-values for Items 16 through 20 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 16			Item 17			Item 18			Item 19			Item 20		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	6	2.83	.75	8	2.38	1.19	8	3.63	1.19	8	3.63	1.06	8	3.75	1.39
31 - 35	13	3.25	1.16	12	2.84	1.45	13	3.49	1.14	13	3.85	.89	12	3.98	1.27
36 - 40	36	3.14	1.14	36	3.07	1.29	36	3.55	1.03	36	3.64	1.11	36	4.10	.91
41 - 45	40	2.94	1.14	40	3.19	1.13	41	3.53	.89	41	3.75	.91	41	3.89	.97
46 - 50	48	3.06	1.14	48	3.06	1.21	48	3.37	1.05	49	3.73	1.18	49	3.87	1.17
51 - 55	41	2.88	1.22	41	2.79	1.12	39	3.45	.99	41	3.63	1.10	41	4.07	.90
56 and over	89	3.12	1.08	87	3.07	1.14	88	3.57	.99	88	3.51	.93	87	3.88	.94
F - Value		.43			.89			.26			.48			.41	
F - Prob.		.86			.51			.95			.83			.87	

Table B.21. Mean Scores, Standard Deviations, and F-values for Items 21 through 25 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 21			Item 22			Item 23			Item 24			Item 25		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	7	2.86	1.22	7	3.43	1.27	8	3.75	1.04	7	2.57	.53	8	3.13	1.13
31 - 35	13	3.91	.95	13	3.83	1.06	13	3.32	.85	13	3.06	.96	13	2.85	.68
36 - 40	36	3.68	1.14	36	3.87	.64	36	3.87	.83	36	3.11	1.16	36	3.26	.90
41 - 45	41	3.47	.98	40	3.62	.85	41	3.82	.89	39	3.01	1.20	41	3.13	.78
46 - 50	49	3.53	1.05	49	3.61	.77	49	3.94	.77	49	2.74	.89	49	3.14	.90
51 - 55	41	3.34	1.05	41	3.52	.97	41	4.15	.80	41	2.85	1.11	41	2.91	.91
56 and over	88	3.56	1.00	89	3.58	.78	89	3.89	.81	87	2.89	.98	88	2.99	.87
F - Value		1.18			.87			1.85			.68			.86	
F - Prob.		.32			.52			.09			.66			.52	

*Significant difference at .05 level.

Table B.22. Mean Scores, Standard Deviations, and F-values for Items 26 through 30 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 26			Item 27			Item 28			Item 29			Item 30		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	4.50	.53	8	3.38	.92	8	4.63	.52	8	3.63	1.06	8	3.38	1.41
31 - 35	13	4.47	.52	12	3.73	.96	13	4.23	1.00	13	3.60	.95	13	3.58	1.06
36 - 40	36	4.51	.51	36	3.32	.92	36	4.03	.84	36	3.71	.91	36	3.21	.96
41 - 45	41	4.45	.50	40	3.66	1.01	41	4.10	.86	41	3.52	1.04	41	3.55	1.05
46 - 50	49	4.51	.66	45	3.49	.99	49	4.19	.85	18	3.64	.95	48	3.25	1.12
51 - 55	41	4.36	.66	38	3.53	.83	41	3.96	.92	40	3.52	1.16	41	3.08	1.07
56 and over	88	4.36	.57	88	3.56	.82	89	3.90	.88	89	3.27	1.15	88	2.97	1.05
F - Value		.63			.66			1.41			1.12			1.86	
F - Prob.		.71			.68			.21			.35			.09	

Table B.23. Mean Scores, Standard Deviations, and F-values for Items 31 through 33A on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 31			Item 32A			Item 32B			Item 32C			Item 33A		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	3.63	1.51	7	4.57	.53	8	4.63	.52	8	4.13	.64	7	4.43	.53
31 - 35	13	4.02	1.08	13	4.30	.85	13	4.47	.52	13	4.15	1.13	13	4.53	.66
36 - 40	36	3.40	1.00	36	4.25	.69	36	4.42	.65	36	3.84	.88	36	4.45	.56
41 - 45	41	3.65	1.09	40	4.29	.64	41	4.36	.62	40	3.73	.97	41	4.45	.52
46 - 50	49	3.70	1.04	49	4.24	.63	48	4.28	.54	49	4.08	.79	49	4.34	.59
51 - 55	41	3.81	.97	41	4.12	.64	41	4.24	.54	41	3.83	.79	41	4.34	.53
56 and over	89	3.47	.99	87	4.16	.70	87	4.23	.59	86	3.79	.93	89	4.31	.55
F - Value		1.19			.73			1.19			1.08			.68	
F - Prob.		.31			.62			.31			.37			.67	

Table B.24. Mean Scores, Standard Deviations, and F-values for Items 33B through 36 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 33B			Item 33C			Item 34			Item 35			Item 36		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	4.50	.53	8	4.38	.74	7	2.86	1.35	8	4.38	.74	7	3.57	.98
31 - 35	13	4.62	.50	13	4.53	.52	13	1.92	.63	13	3.94	.51	13	3.68	.85
36 - 40	36	4.47	.65	36	4.31	.58	36	2.26	.91	36	3.93	.87	36	3.38	1.15
41 - 45	41	4.48	.51	41	4.33	.61	41	2.63	1.12	41	3.99	.99	41	3.43	1.20
46 - 50	48	4.39	.49	49	4.40	.49	48	2.34	1.00	49	4.03	.89	49	3.29	1.04
51 - 55	41	4.37	.49	41	4.17	.55	41	2.28	1.02	40	3.81	.91	41	3.21	1.19
56 and over	88	4.34	.52	88	4.23	.56	88	2.45	1.05	86	3.68	1.02	89	3.49	1.13
F - Value		.95			1.27			1.32			1.42			.53	
F - Prob.		.46			.27			.25			.21			.78	

Table B.25. Mean Scores, Standard Deviations, and F-values for Items 37 through 41 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 37			Item 38			Item 39			Item 40			Item 41		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	3.75	1.28	7	3.57	.98	7	3.29	.49	7	2.57	1.13	7	4.14	.69
31 - 35	13	3.70	.85	13	3.27	1.11	13	3.85	.68	13	2.64	1.05	13	4.38	.86
36 - 40	36	3.65	.84	36	3.83	1.02	36	3.12	1.06	36	2.62	.97	36	4.28	.88
41 - 45	41	3.78	.94	39	3.87	.81	40	3.09	1.10	41	2.73	1.09	41	4.31	.78
46 - 50	48	3.75	.97	47	3.58	.91	46	3.08	1.09	49	2.72	1.01	48	4.42	.74
51 - 55	41	3.96	.80	40	3.89	.90	41	3.56	.94	41	2.49	.83	41	4.37	.94
56 and over	89	3.76	.89	89	3.63	1.02	88	3.36	1.07	89	2.81	.89	89	4.16	.81
F - Value		.44			1.25			1.92			.60			.71	
F - Prob.		.85			.28			.08			.73			.65	

Table B.26. Mean Scores, Standard Deviations, and F-values for Items 42 through 46 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 42			Item 43			Item 44			Item 45			Item 46		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	8	3.13	1.46	8	4.25	.46	8	4.00	.76	6	3.33	1.63	7	3.71	1.38
31 - 35	12	4.18	.94	13	4.06	.77	13	3.47	1.19	13	3.89	1.14	13	3.79	1.02
36 - 40	36	3.56	1.03	36	3.94	.97	36	3.57	1.29	36	3.85	.85	36	3.21	1.02
41 - 45	41	3.88	.99	41	3.93	.90	41	3.30	1.05	41	3.90	1.06	41	3.55	1.00
46 - 50	49	3.90	.96	48	3.90	.90	48	3.39	1.02	49	4.02	.84	47	3.47	1.03
51 - 55	41	1.09	.89	41	4.13	.90	41	3.39	1.16	41	4.09	.97	41	3.32	1.14
56 and over	88	3.85	1.01	89	4.13	.85	88	3.58	.92	87	4.16	1.06	85	3.53	1.12
F - Value		1.86			.68			.81			1.09			.81	
F - Prob.		.09			.67			.56			.37			.56	

Table B.27. Mean Scores, Standard Deviations, and F-values for Items 47 through 51 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 47			Item 48			Item 49			Item 50			Item 51		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	6	3.33	1.51	8	3.25	1.49	7	2.86	1.22	7	4.29	.95	6	3.33	1.63
31 - 35	13	3.23	1.22	13	2.83	.98	13	2.94	.96	13	3.49	.98	13	3.83	.69
36 - 40	36	3.65	1.10	35	2.75	1.04	35	2.74	.98	35	3.96	1.10	35	3.56	.93
41 - 45	41	3.85	1.18	41	2.94	1.17	41	3.20	1.07	41	3.96	1.12	41	3.92	.85
46 - 50	47	3.90	.93	49	2.64	1.01	49	2.77	1.01	49	4.28	.83	48	3.62	1.02
51 - 55	41	3.57	1.30	41	2.43	.97	41	2.88	1.01	41	4.16	1.00	41	3.85	.87
56 and over	89	3.72	.96	88	2.77	1.08	88	3.10	.98	88	4.05	1.07	89	3.64	.98
F - Value		1.02			1.20			1.32			1.30			.95	
F - Prob.		.41			.31			.25			.26			.46	

Table B.28. Mean Scores, Standard Deviations, and F-values for Items 52A through 55 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Age

	Item 52A			Item 52B			Item 53			Item 54[1]			Item 55		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
30 or less	7	3.29	1.38	7	3.14	1.22	7	3.71	1.38	7	3.86	.90	7	2.71	.76
31 - 35	13	3.60	.76	13	3.10	.86	13	4.15	.68	13	4.38	.65	13	2.32	1.03
36 - 40	35	3.42	1.04	35	2.99	1.08	35	4.07	.64	35	3.93[a]	.62	35	2.35	1.02
41 - 45	41	3.81	.78	41	3.29	1.04	40	4.43	.69	41	4.42[b]	.60	41	2.76	1.15
46 - 50	46	3.50	.92	43	3.31	1.01	49	4.22	.68	49	4.42[c]	.71	49	2.95	1.11
51 - 55	41	3.46	1.14	40	3.22	1.08	41	4.34	.76	41	4.34[d]	.69	41	2.68	1.29
56 and over	87	3.57	.92	87	3.18	.93	89	4.09	.77	89	4.20[e]	.63	89	2.60	1.12
F - Value		.82			.44			1.86			3.09			1.29	
F - Prob.		.56			.85			.09			.01*			.26	

[1]SNK's test: a is significantly different from b, c, d, and e.
*Significant at .05 level.

Table B.29. Mean Scores, Standard Deviations, and T-values for Items 9 through 55 on the TQIAS for the Combined Weighted Sample of Faculty and DEOs By Tenure

	Tenured			Non Tenured				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 9								
Student	228	4.74	.58	49	4.68	.59	.70	.49
Parents	227	3.00	.97	47	2.30	.75	4.69	.00*
Alumni	226	2.72	.95	49	2.59	.91	.87	.39
Employers	227	3.37	.99	49	3.41	1.08	-.25	.80
Sta/Loc. Gov.	227	2.98	.96	48	3.04	1.01	-.36	.72
Bus./Ind.	226	2.80	.97	49	2.64	.89	1.02	.31
Fed. Gov.	227	2.52	.91	49	2.54	.82	-.13	.89
Faculty	227	4.10	.89	49	4.19	.80	-.64	.53
Other Offices	212	2.72	.99	44	2.72	1.11	-.03	.97
Item 10	230	3.98	.92	49	3.96	1.06	.17	.87
Item 11	229	2.68	1.23	49	2.72	1.26	-.20	.84
Item 12	229	3.49	.96	49	3.56	.98	-.57	.57
Item 13	230	4.16	.70	49	4.30	.62	-1.33	.18
Item 14	230	1.76	.85	48	1.88	.79	-.88	.38
Item 15	230	4.23	.77	48	4.41	.68	-1.59	.11
Item 16	228	2.99	1.14	47	3.34	1.00	-1.98	.05*
Item 17	226	3.02	1.16	48	2.98	1.33	.21	.83
Item 18	227	3.46	.99	49	3.70	1.01	-1.52	.13
Item 19	229	3.58	1.04	49	3.92	.88	-2.14	.03*
Item 20	228	3.96	.97	48	3.58	1.17	.67	.50
Item 21	229	3.51	1.04	48	3.60	.81	-.58	.56
Item 22	230	3.60	.81	47	3.76	.91	-1.21	.23
Item 23	230	3.93	.82	49	3.72	.86	1.63	.10
Item 24	226	2.89	1.02	48	2.97	1.10	-.52	.61
Item 25	229	3.06	.89	49	3.08	.81	.19	.85
Item 26	229	4.40	.59	49	4.57	.50	-1.95	.05*
Item 27	222	3.54	.90	47	3.47	.90	.52	.60
Item 28	230	4.01	.87	49	4.20	.89	-1.41	.16
Item 29	228	3.45	1.08	49	3.69	.96	-1.43	.15
Item 30	228	3.12	1.07	49	3.54	1.03	-2.54	.01*
Item 31	230	3.56	1.03	49	3.84	1.05	-1.76	.08
Item 32A	228	4.18	.66	47	4.40	.71	-2.12	.04*
Item 32B	227	4.26	.57	49	4.51	.62	-2.75	.01*
Item 32C	227	3.85	.89	48	4.00	.90	-1.08	.28
Item 33A	230	4.34	.55	48	4.52	.58	-2.07	.04*
Item 33B	228	4.38	.50	49	4.53	.62	-1.87	.06
Item 33C	229	4.27	.55	49	4.41	.61	-1.56	.12
Item 34	228	2.38	1.04	48	2.44	.99	-.32	.75
Item 35	226	3.82	.97	49	4.13	.70	-2.12	.01*

Table B.29. (continued)

	Tenured			Non Tenured				
Group	N	Mean	SD	N	Mean	SD	t	Prob.
Item 36	230	3.39	1.15	48	3.46	.97	-.38	.71
Item 37	229	3.78	.91	49	3.76	.88	.14	.89
Item 38	229	3.71	.95	47	3.65	1.01	.44	.66
Item 39	227	3.29	1.07	47	3.32	.93	-.22	.83
Item 40	230	2.75	.94	48	2.47	1.01	1.87	.06
Item 41	229	4.23	.86	48	4.52	.55	-2.20	.03*
Item 42	229	3.87	.98	48	3.78	1.14	.58	.56
Item 43	229	4.02	.89	49	4.08	.79	-.38	.71
Item 44	228	3.47	1.01	49	3.55	1.24	-.52	.60
Item 45	228	4.06	.97	47	3.78	1.13	1.79	.07
Item 46	224	3.44	1.06	48	3.57	1.15	-.73	.46
Item 47	228	3.70	1.07	47	3.74	1.22	-.24	.81
Item 48	228	2.73	1.08	49	2.75	1.07	-.11	.92
Item 49	229	2.97	1.02	47	2.94	.99	.17	.86
Item 50	229	4.11	1.02	47	3.84	1.07	1.66	.10
Item 51	230	3.70	.94	45	3.73	1.01	-.19	.85
Item 52A	225	3.54	.95	47	3.61	.99	-.49	.62
Item 52B	223	3.20	1.00	46	3.16	1.03	.29	.77
Item 53	229	4.20	.74	47	4.17	.81	.23	.82
Item 54	230	4.28	.66	47	4.17	.73	.99	.32
Item 55	230	2.72	1.17	47	2.34	.89	2.11	.04*

*Significant at .05 level.

Table B.30 Mean Scores, Standard Deviations, and F-values for Items 9A through 55 on the TQIAS for a Combined Weighted Sample of Faculty and DEOs by Length of Time as a Faculty Member in a Higher Education Institution

	10 Years or less			11 - 20 years			Over 20 Years			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 9											
Student	68	4.66	.59	89	4.77	.45	119	4.73	.66	.62	.54
Parent[1]	66	2.55[a]	.86	88	2.95[b]	.99	119	3.01[c]	.97	5.32	.01*
Alumni	68	2.58	.85	88	2.74	.99	119	2.73	.96	.63	.53
Employers	68	3.31	.97	88	3.38	1.10	119	3.42	.96	.29	.75
Business/Ind	67	2.98	.93	89	2.94	1.04	118	3.03	.93	.21	.81
Sta./Loc. Gov.	68	2.63	.80	89	2.77	1.03	117	2.85	.97	1.13	.32
Federal Gov.	68	2.49	.83	89	2.47	.94	118	2.59	.90	.60	.55
Faculty	68	4.04	.85	89	4.10	.93	118	4.17	.85	.51	.60
Other Offices	63	2.65	1.03	84	2.71	1.08	107	2.77	.95	.29	.75
Item 10	68	3.93	1.01	90	4.12	.94	120	3.90	.90	1.55	.21
Item 11	68	2.71	1.25	88	2.79	1.34	120	2.59	1.13	.69	.50
Item 12	68	3.44	1.02	90	3.52	.93	119	3.49	.85	.14	.87
Item 13	68	4.22	.65	90	4.25	.67	120	4.12	.72	.90	.41
Item 14	67	1.78	.83	90	1.89	1.01	120	1.71	.68	1.15	.32
Item 15[2]	67	4.33	.66	90	4.38[d]	.72	120	4.13[e]	.81	3.29	.04*
Item 16	65	3.29	1.07	88	3.00	1.12	120	2.96	1.14	1.99	.14
Item 17	67	2.96	1.28	87	3.14	1.22	119	2.95	1.10	.69	.50
Item 18	67	3.54	1.01	89	3.37	.99	119	3.58	1.00	1.20	.30
Item 19	68	3.66	1.04	90	3.72	1.10	119	3.56	.95	.61	.55
Item 20	67	3.88	1.15	90	3.94	1.04	118	3.97	.89	.19	.82
Item 21	67	3.51	1.08	89	3.49	1.04	119	3.55	1.02	.07	.93
Item 22	66	3.67	.87	90	3.71	.77	120	3.54	.86	1.26	.28
Item 23[3]	68	3.65[f]	.89	90	3.96[g]	.85	120	3.98[h]	.76	3.90	.02*
Item 24	67	3.01	1.05	88	2.90	1.03	118	2.85	1.03	.55	.58
Item 25	68	2.99	.82	89	3.22	.94	119	2.98	.84	2.20	.11
Item 26[4]	68	4.51	.50	90	4.50[i]	.59	119	4.33[j]	.60	3.38	.04*
Item 27	64	3.50	.87	88	3.51	1.03	116	3.56	.81	.11	.89
Item 28	68	4.10	.91	90	4.13	.85	120	3.95	.87	1.30	.28
Item 29	68	3.61	.90	89	3.58	1.02	119	3.36	1.16	1.61	.20
Item 30[5]	67	3.36	1.04	89	3.35[k]	1.13	119	2.98[l]	1.03	4.16	.02*
Item 31	68	3.50	1.16	90	3.74	1.07	120	3.57	.94	1.12	.33
Item 32A	66	4.26	.79	90	4.26	.59	118	4.16	.66	.80	.45
Item 32B	68	4.43	.63	88	4.31	.56	119	4.24	.57	2.45	.09
Item 32C	67	3.79	.99	89	3.98	.83	118	3.84	.88	.95	.39
Item 33A	67	4.43	.66	90	4.40	.52	120	4.31	.52	1.30	.27
Item 33B	68	4.49	.61	89	4.45	.50	119	4.32	.49	2.66	.07
Item 33C	68	4.35	.62	90	4.36	.53	119	4.21	.55	2.41	.09
Item 34	67	2.26	.95	89	2.53	1.10	119	2.36	1.02	1.42	.24
Item 35	68	4.06	.77	88	3.82	1.02	117	3.80	.95	1.91	.15

Table B.30 (continued)

	10 Years or less			11 - 20 years			Over 20 Years			F	F
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	value	prob.
Item 36	67	3.46	.99	89	3.44	1.23	120	3.34	1.10	.37	.69
Item 37	67	3.67	.91	89	3.74	.93	120	3.85	.87	.91	.40
Item 38	65	3.71	1.00	86	3.67	.90	120	3.72	.99	.05	.95
Item 39	65	3.43	.92	88	3.09	1.16	119	3.37	1.01	2.65	.07
Item 40	67	2.70	1.00	90	2.80	1.04	120	2.62	.85	.92	.40
Item 41	67	4.28	.86	89	4.36	.73	120	4.23	.87	.65	.52
Item 42	67	3.72	1.07	90	3.94	.98	119	3.86	.98	.95	.39
Item 43[6]	68	4.05	.75	89	3.83[m]	.96	120	4.17[n]	.85	3.81	.02*
Item 44	67	3.54	1.16	90	3.43	1.08	119	3.49	.98	.21	.81
Item 45[7]	66	3.72[o]	1.05	90	4.13[p]	.88	118	4.10[q]	1.04	3.93	.02*
Item 46	65	3.41	1.07	90	3.56	.98	116	3.43	1.15	.51	.60
Item 47	65	3.56	1.16	89	3.74	1.10	120	3.76	1.05	.80	.45
Item 48	68	2.79	1.07	89	2.84	1.09	119	2.63	1.06	1.15	.32
Item 49	66	3.00	1.04	90	2.96	1.03	119	2.95	.99	.05	.95
Item 50[8]	66	3.77[r]	1.15	90	4.13[s]	.95	119	4.17[t]	.99	3.67	.03*
Item 51	64	3.71	.90	90	3.58	1.06	120	3.80	.88	1.36	.26
Item 52A	66	3.42	.93	88	3.67	.93	117	3.53	.99	1.30	.27
Item 52B	65	3.15	.92	86	3.23	1.10	116	3.20	.98	.14	.87
Item 53	66	4.08	.79	89	4.29	.67	120	4.18	.78	1.53	.22
Item 54[9]	66	4.06[u]	.70	90	4.41[v]	.60	120	4.26	.68	5.23	.01*
Item 55	66	2.55	.98	90	2.64	1.17	120	2.74	1.19	.63	.53

[1]SNK's test: a is significantly different from b and c.
[2]SNK's test: d is significantly different from e.
[3]SNK's test: f is significantly different from g and h.
[4]SNK's test: i is significantly different from j.
[5]SNK's test: k is significantly different from l.
[6]SNK's test: m is significantly different from n.
[7]SNK's test: o is significantly different from p and q.
[8]SNK's test: r is significantly different from s and t.
[9]SNK's test: u is significantly different from v.
*Significant difference at $\alpha = .05$ level.

APPENDIX C

CORRESPONDENCE

IOWA STATE UNIVERSITY

College of Education
Professional Studies
N243 Lagomarcino Hall
Ames, Iowa 50011-3190
515 294-4143

April 27, 1994

Dear Faculty Member or Administrator:

I am a doctoral candidate in the Department of Professional Studies. As part of my degree requirements, I am conducting a study of the preferences of faculty and administration at Iowa State University for some leadership attributes. For this purpose, I have developed the enclosed questionnaire, which should take about ten minutes to complete. I have made every attempt to make the questionnaire short and user friendly. Since completion of my dissertation depends on receiving your responses, I would very much appreciate it if you would fill out the survey and return it in the envelope provided.

The sample includes over 700 faculty and administrators from Iowa State University. In order to ensure complete confidentially of the responses, the questionnaires are not coded in any manner with personal identifiers. I would appreciate your comments. If you wish, write your comments on a separate paper and enclose it with the survey. In return for your time, I will be glad to send you a summary of the findings when they are available. You may attach a note to the questionnaire and include your name and address, or if you want to remain anonymous, send a written request and mail it to me in a separate envelope. If you have any questions regarding this research, please feel free to call me at 296-8113. Your time is greatly appreciated.

Sincerely,

Anita Ousley

Anita Ousley
Doctoral Candidate
College of Education

Daniel C. Robinson

Daniel C. Robinson, PhD
Major Professor
College of Education

IOWA STATE UNIVERSITY

College of Education
Professional Studies
N243 Lagomarcino Hall
Ames, Iowa 50011-3190
515 294-4143

May 5, 1994

Recently you received a questionnaire regarding faculty and administrators' preferences for some leadership attributes. **To ensure complete confidentiality of the responses, none of the questionnaires were coded with any personal identifiers.** This survey is an essential part of my doctoral dissertation, the completion of which rests on the return of the questionnaires.

Thank you for the time you spent on filling and returning the questionnaire. If you have not yet found the time, to complete it, would you please take a few minutes to fill out the survey and return it to me.

If you have lost the questionnaire or need another copy please call and I will send you one immediately.

Again thank you for your time and have a pleasant and happy summer.

Sincerely,

Anita Ousley

Anita Ousley
Doctoral Candidate
296 - 8113

Daniel C. Robinson

Daniel C. Robinson, PhD
Major Professor
College of Education